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Improved Sawing Machine.

The accompanying engravings represent a machine for sawing shingles, box boards, &c., recently invented by Franklin Muzzy, of Bangor, Maine. The principal feature of novelty in it is the device for regulating the motion of the carriage automatically by the size of the block, in such manner that as soon as the saw is carried through the block the motion of the carriage is reversed, thus avoiding any waste of power or time in running the saw when it is doing no work.

Fig. 1 is a perspective view of the machine, and Fig. 2 is a section of the apparatus by which the motion of the carriage is changed. The block, A Fig. 1, is placed directly over the saw upon the carriage, B, which moves vertically downward while the shingle is being cut. The descent of the carriage is arrested as soon as the saw has passed through the block, the carriage then rises so as to lift the block above the saw, the block is fed forward in the usual manner each end alternately more than the other in order to give the proper taper to the shingle, and the carriage again descends, all by action of the mechanism without the necessity of any attention on the part of the operator.

Fig. 1

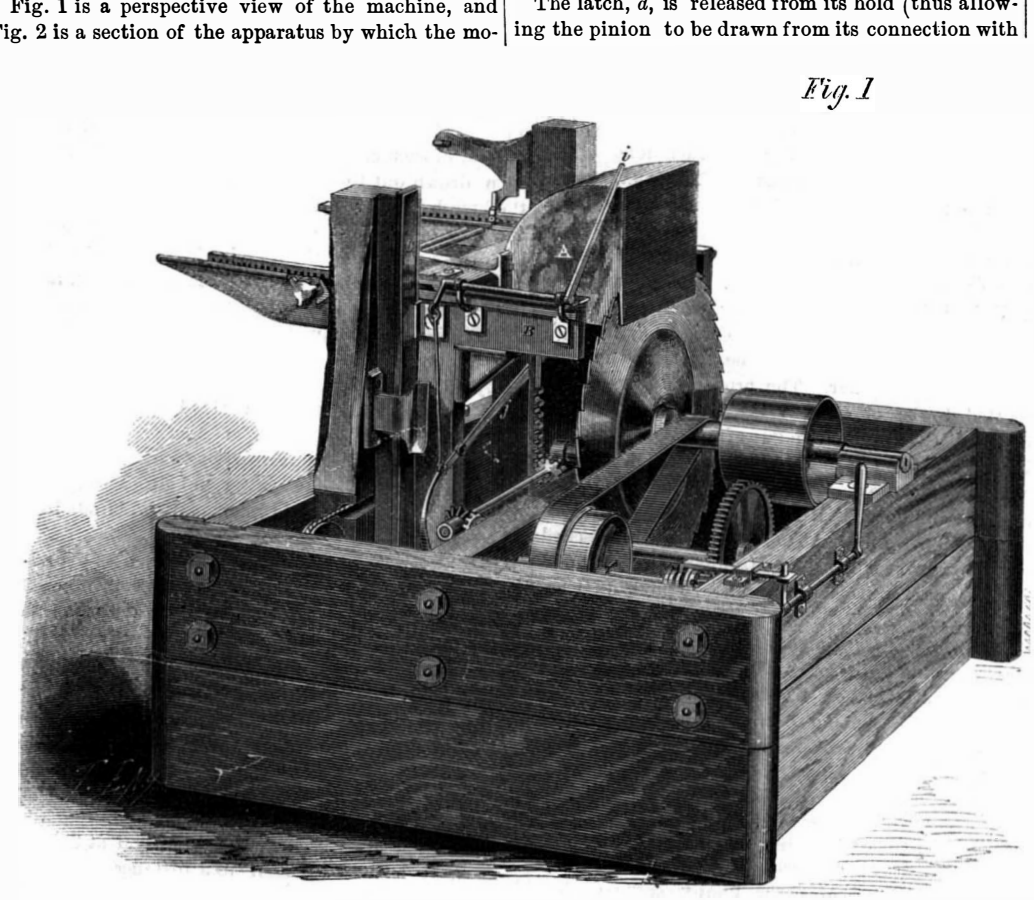
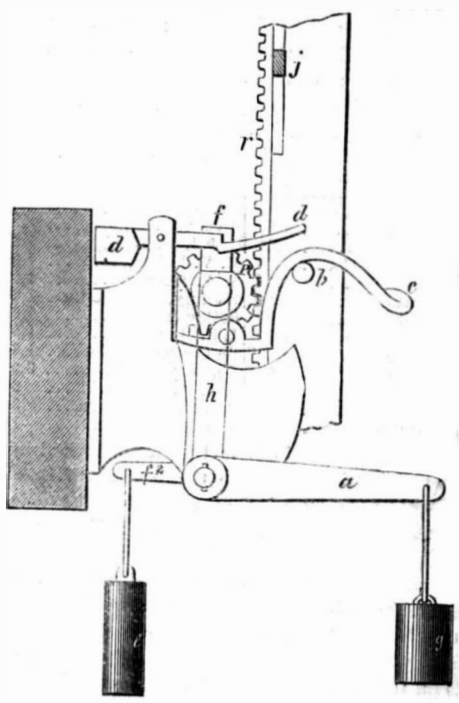


Fig. 2



MUZZY'S SAWING MACHINE.

The mechanism for raising and lowering the carriage is shown in Fig. 2. The rack, *r*, is secured firmly to the carriage and meshes into the pinion, P, which receives a constant rotary motion from the driving power in a direction to carry the rack downward. This pinion is hung in an upright lever or standard, *f*, which is set in a rock shaft, *s*, allowing it an oscillating motion sufficient to withdraw the pinion from its hold upon the rack. The upright, *f*, has attached to its lower end the arm, *f2*, to the outer end of which the weight, *e*, is attached, tending to draw the pinion, P, away from its connection with the rack, *r*. This pinion is held in place by the heavier weight, *g*, attached to the longer lever, *a*, which has an upright arm, *h*, pressing against a projection on the upright, *f*. As the carriage descends the pin, *b*, which is inserted in its side, comes in contact with the cam-like projection on the side of the arm, *h*, and presses it away from the upright, *f*, when it is caught and held by the short arm of the latch, *c*. The pinion, P, would then be immediately drawn away from the rack, *r*, were it not held in place by the latch, *d*.

The latch, *d*, is released from its hold (thus allowing the pinion to be drawn from its connection with the rack and the motion of the carriage to be reversed), whenever the saw has passed through the block, by mechanism shown in Fig. 1. A lever, *i*, has one end resting upon the block and the other attached to a rock shaft, while to an arm on the same shaft the lever, *j*, is connected by a rod, as shown. The opposite end of the lever, *j*, is shown at *j* in Fig 2. As the carriage descends this end of the lever strikes the latch, *c*, and presses it from its hold. It will be seen that the lower this end of the lever is, the more quickly will the carriage be arrested in its downward journey, and the altitude of this end of the lever, *j*, depends upon the thickness of the block on which the outer end of the lever, *i*, rests. Consequently, when these parts are once properly adjusted to the diameter of the saw, the vertical motion of the carriage will be reversed automatically as soon as the saw has passed through the block, whatever the thickness of the block and though its thickness be constantly varying, as is usually the case. When the sawing of the bolt is completed the motion of the carriage is automatically arrested until a new bolt has been supplied, when the work proceeds as before.

As this machine cuts shingles from the quarter bolt with the natural curve of the log, it uses lumber with the greatest possible economy, while the greatest economy of time and power is effected by the reversal in the motion of the carriage as soon as each shingle is cut, and the sawing of the shingles in planes so nearly parallel with the grain of the wood secures the best quality in the article produced.

The machine is applicable to a great variety of purposes. For sawing box boards or other descriptions of lumber with parallel sides, the ends of the bolt are fed forward simultaneously instead of alternately.

The patent for this invention was granted through the Scientific American Patent Agency, July 8, 1862, and further information in relation to it may be obtained by addressing the inventor, Hon. Franklin Muzzy, at Bangor, Maine.

SELF-SEALING STAMPED NEWSPAPER WRAPPER.—One of the most convenient little articles that have recently come under our notice, is the self-sealing newspaper wrapper. It is simply a piece of smooth buff paper with a strip of gum along one edge, so that it is ready to be folded around the paper, and by moistening the gum with the tongue is held securely in place. The inventor, after some two years of persistent effort, has induced the Post Office Department to adopt these wrappers, and they are now sold at the principal post offices with the Government stamp on each, which pays the postage on a paper.

THE first locomotive engine in Nebraska, lately arrived at Nebraska city, and has made a trial trip. It is called the "Prairie Motor" and is designed for the transportation of goods and passengers on the common road. We suspect that its trips on the common road on the prairies will not prove very profitable.

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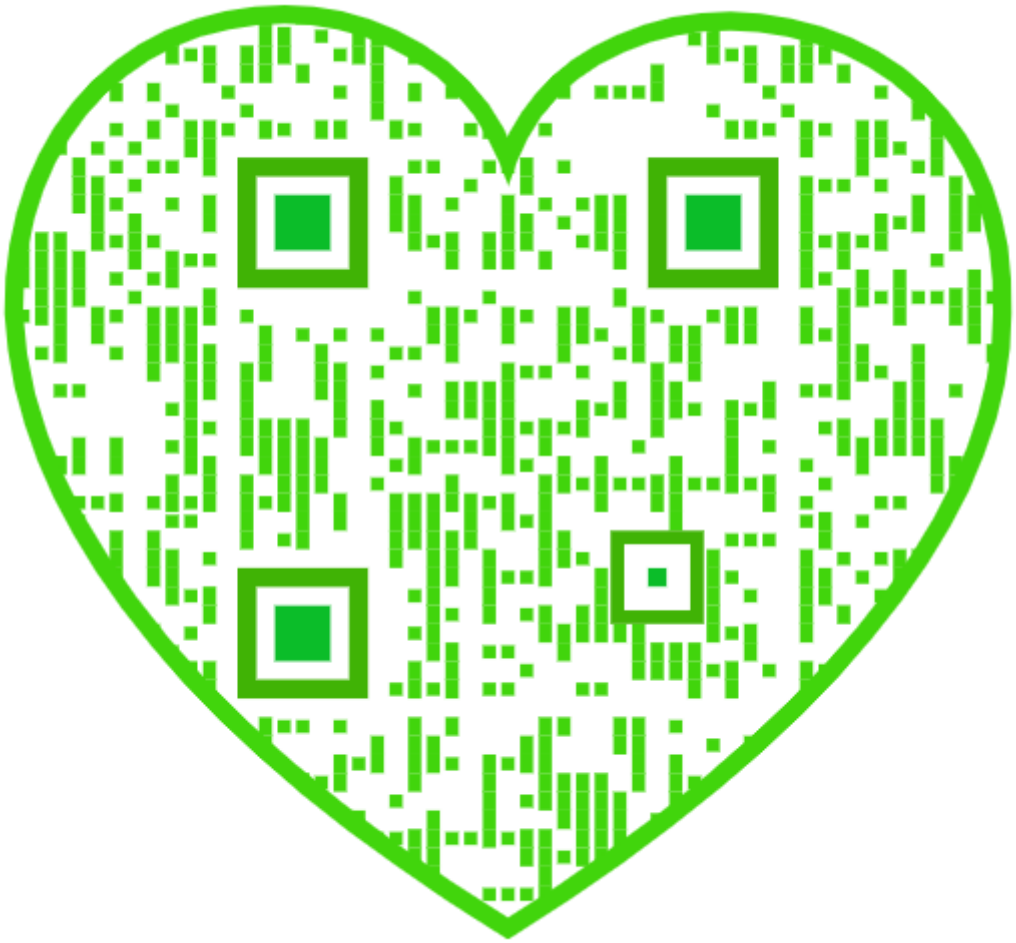

NOTES ON MILITARY AND NAVAL AFFAIRS.

No event of any importance has occured during the past week. It seems that our armies are so frittered away, that until they are recruited nothing can be done. The nation, with inexhaustible patience, is devoting itself to the effort of again filling the ranks. All over the country meetings are being held, and subscriptions are being raised to offer bounties to recruits. The meeting in Philadelphia illustrates the the spirit universally displayed.

The Mayor stated that he was waited upon a few days ago by several gentlemen, who agreed to contribute certain sums to aid in recruiting, provided $100,000 could be obtained for the same object. They placed the following in his hands, which he read to the meeting :—

To His Honor Mayor Henry, Philadelphia :—The undersigned acting upon a suggestion made in one of the city papers a few days ago, to raise $100,000 or more to aid in the immediate enlistment of ten new regiments in this city, herewith hand you a list of the amounts we have subscribed and offered to pay as soon as the sum named above is pledged, the whole, if the other subscribers consent, to be expended at your discretion, in such manner as will best promote the object desired. Believing that the sum could be made up very soon if the plan were more fully known, we would respectfully suggest that you give the matter the sanction of your name by a notice in the city papers.

Wm. Sellers & Co., $2,000; A. Whitney & Sons, $3,000; M. W. Baldwin & Co., $2,000; Belmont & Dougherty, $1,000; Matthews & Moore, $1,000; Thos. Potter, $1,000; John Rice, $1,000; A. Jenks & Son, $1,000; Wm. F. Potts, $1,000; Jos. K. Wheeler, $1,000; Andrew Wheeler, $1,000.

The following subscriptions were then announced :

Chas. Gilpin	$1,000	Wm. Welsh	$1,000
J. T. Lewis & Bro.	1,000	John Ashurst	1,000
J. E. Caldwell	1,000	John Haseltine	1,000
McKean, Borie & Co.	3,000	Hanson Robinson	1,000
Sam. S. White	1,000	Stuart & Bro.	1,000
Wm. H. Kearn	1,000	S. & J. M. Flanigan	1,000
E. C. Knight & Co.	1,000	M. V. Baker	1,000
George H. Stuart	1,000	S. A. Mercer	1,000
H. M. Watt	1,000	Welling, Coffin & Co.	1,000
F. J. Dreer	1,000	Bailey & Co.	1,000
J. B. Myers & Co.	1,000	J. B. Myers	1,000
Taylor, Gillespie & Co.	1,000	De Coursey & Co.	1,000
Sherman & Co.	1,000	Whitney & Sons	3,000
Sellers & Co.	2,000	Geo. D. Wetherill	300
Thomas W. Price	300	Cornelius Walborn	300
Dr. McClintock	100	Geo. R. Smith	100

Mr. Wm. Welsh said he had been authorized by a friend to subscribe $1,000 to the fund; and it was stated that a subscription of $50,000 to the object had been made by the Pennsylvania Railroad Company.

Several recruiting offices are opened in New York, and a curious principle of human nature is illustrated in the fact, that, while those in the buildings on Broadway and other streets are generally empty, the tents on the Park are nearly always surrounded by a crowd. We observed the same circumstance when the enlistments were going on last spring.

ENFORCEMENT OF THE CONFISCATION ACT.

In accordance with one of the provisions of the confiscation act, the President has issued the following proclamation :—

In pursuance of the sixth section of the act of Congress entitled "An act to suppress insurrection, to punish treason and rebellion, to seize and confiscate the property of rebels, and for other purposes," approved July 17, 1862, and which act, and the joint resolution explanatory thereof, are herewith published, I, Abraham Lincoln, President of the United States, do hereby proclaim to and warn all persons within the contemplation of said sixth section to cease participating in, aiding, countenancing, or abetting the existing rebellion, or any rebellion, against the Government of the United States, and to return to their proper allegiance to the United States, on pain of the forfeitures and seizures as within and by said sixth section provided.

In testimony whereof I have hereunto set my hand and caused the seal of the United States to be affixed.

ABRAHAM LINCOLN.

WILLIAM H. SEWARD, Secretary of State.

Annexed is the sixth section of the confiscation act referred to by the President in the above proclamation :—

SEC. 6. *And be it further enacted*, That if any person within any State or Territory of the United States, other than those named as aforesaid, after the passage of this act, being engaged in armed rebellion against the Government of the United States, or aiding or abetting such rebellion, shall not, within sixty days after public warning and proclamation duly given and made by the President of the United States, cease to aid, countenance and abet such rebellion, and return to his allegiance to the United States, all the estate and property, moneys, stocks and credits of such person shall be liable to seizure as aforesaid, and it shall be the duty of the President to seize and use them as aforesaid, or the proceeds thereof. And all sales, transfers or conveyances of any such property after the expiration of the said sixty days from the date of such warning and proclamation shall be null and void; and it shall be a sufficient bar to any suit brought by such person for the possession or the use of such property, or any of it, to allege and prove that he is one of the persons described in this section.

RUNNING THE BLOCKADE.

According to the Charleston *Mercury*, the *Nashville* not only entered that port recently, with arms and ammunition, in spite of the blockade, but has gone safely to sea again in company with another vessel, the *Kate*.

CAPTURE OF A BRITISH STEAMER.

The United States steamer *Octorara*, with Commander Porter in command, arrived at Fortress Monroe on the 26th of July, from New Orleans. On the 24th ult., the steamer fell in with the British screw steamship *Tubal Cain*, near Charleston, bound from Nassau, loaded with munitions of war After a gallant chase of six hours, Commander Porter captured her. A prize crew was put on board, and she was sent to New York, where she arrived on the 29th. She is 194 tuns burden, iron built, fifty-horse power, was built at Paisley, and is nine years old. The vessel and cargo are valued at $250,000. Her cargo consists of small arms, saltpeter, salt, soldiers' buttons, shells, and various other goods suitable for the Southern market.

ARRANGEMENT FOR EXCHANGE OF PRISONERS.

An arrangement has been made for a general exchange of prisoners, and on the 25th of July, 900 arrived at Harrison's Landing from Richmond.

GUERILLAS IN TENNESSEE AND ALABAMA,

On the 22d of July, attacked Florence, Alabama. They entered the city and burned all the warehouses used for our commissary and quartermaster stores, and all the cotton in the vicinity. They also seized the United States steamer *Colonna*, used for conveying army supplies over the shoals. They took all the money belonging to the boat and passengers, and then burned her. The property destroyed is reported to be of great value. A small detachment of General Mitchel's army was captured. The rebels then proceeded down the Tennessee river to Chickasaw, Waterloo and the vicinity of Eastport, and burned all the warehouses which contained cotton. Another band of forty rebels attacked a wagon train near Pittsburg Landing, and captured sixty wagons conveying commissary and quartermaster stores.

The 10th Ohio regiment, guarding the Memphis and Charleston Railroad between Decatur and Courtland, were attacked on the 26th of July by a large force of guerillas under Starns and Ward. Thirty or forty of the regiment are said to have been killed. The road was considerably damaged, but not so much as to cut off communication.

The Oldest Existing Photographs.

[From the Photographic News.]

At a recent dinner of "The Photographic Club," we had an opportunity of examining one of the most interesting mementoes of early photographic investigation and experiment. It consisted of a heliograph, in the possession of Mr. Joseph Ellis, of Brighton, whose name will be familiar to old photographers. Mr. Ellis gave some interesting details of the history of the picture, and of his possession of it. M. Nicéphore Niepce, it may be remembered, had obtained permanent photographic pictures many years before the publication of Daguerre's discovery, and in the year 1827 visited this country, in the vain hope of being able to obtain the attention of the Royal Society. It appeared that he resided at Kew, and the picture in question had been given by him to his landlord at that time, in whose hand an inscription at the back is found to the following effect :—"This prototype [probably error for phototype] was presented to me at Kew, in the year 1827, by M. N. Niepce, the discoverer of the art.—B. Cussell." Mr. Ellis had seen it in Mr. Cussell's possession some year's ago, and desired to obtain it. Mr. Cussell refused, however, to part with it, regarding it with almost superstitious regard and reverence. For the time, Mr. Ellis had to waive his desire, resolving, however, to keep his eye upon it. He recently learnt that the owner had died, and found, on inquiry, that his effects had been sold by auction. A little search discovered this picture in the hands of a broker, whose chief idea of its value was based on the notion that it was executed on silver. The back had been scratched to test it, and it is to the fact that the metal used was pewter and not one of the noble metals, that this interesting memento, probably one of the earliest sun pictures in existence, was saved from the melting pot. Mr. Ellis purchased the picture, and preserves it with the care naturally pertaining to a picture possessing such historic value. It is a copy of an engraving produced in the camera by the action of light on a film of bitumen, on a pewter tablet. The size was about the ordinary half-plate; the effect is in some respects similar to a Daguerreotype, the image being vigorous and well defined. We may here take occasion to refer the reader interested in the historic details of photography, which are somewhat scarce and scattered, to a couple of published lectures of Mr. Ellis, who, with considerable research, has carefully, and with much ability, traced the earliest known facts, evidently entering upon the task as a labor of love.

RIFLED ORDNANCE AT THE WORLD'S FAIR.

The celebrated Armstrong gun, in all its various stages of manufacture, has been placed in the exhibition by the British Secretary of War. It is constructed entirely of coils of wrought iron, and not, as some have supposed, of a cast-steel tube, hooped with bands of wrought iron. The basis of the gun is a long iron bar, which is first heated and twisted into a spiral form, then hammered into a coiled tube. Several of such coils are shrunk over one another and then drawn out to form the barrel of the gun. At the breech it is strengthened by increased coils, and the fiber of the first one runs longitudinally, while the others run round the barrel. There is a chamber at the breech in which a vent piece is fitted and held in place by a hollow screw.

The quality of the metal used and the workmanship employed in these guns have been highly extolled by all who have visited the exhibition. A smooth-bore muzzle loader and a rifled muzzle loader 70-pounder, made by Sir Wm. Armstrong, are also exhibited; also a shell invented by him, which is furnished with a percussion igniter and also with a time fuse. This shell is made in segments, and bursts into 200 fragments.

J. Whitworth, of Manchester, exhibits a 12-pounder, which is made of soft steel, cast solid, then bored out. The rifling is a twisted hexagon, and the rule of the twist or pitch is one turn in every twenty diameters of the bore. A one-inch gun, therefore, makes one revolution in twenty inches. Mr. Whitworth does not give his rule in the work which was published on rifled guns—the above information is obtained from the London correspondence of the *Scotsman*. The twist is regular, and is much shorter than that followed by American armorers. Whitworth's 12-pounder is a breech loader, and at 35° elevation it has sent a shot to a distance of 10,000 yards.

Captain Blakely exhibits a five hundred pounder. It is a cast iron gun, strengthened with wrought iron hoops, and loads at the muzzle. J. Lancaster, who made the first siege rifled gun used in the Crimean war, exhibits a large gun weighing 10 tuns, and Mr. Clay, of Liverpool, exhibits the steel breech loader, illustrated on page 48, Vol. IV. (new series) SCIENTIFIC AMERICAN. Italy, Germany and Norway have sent samples of cannon to the Exhibition, all of which have been considered inferior in workmanship to the Armstrong and Whitworth guns. This is believed to be due to the use of superior tools in the fabrication of the latter, not to the principles upon which they are constructed.

The Paris *Moniteur universel*, of July 12th, says :—"The Lenoir motor, of which the principle is the dilation of air by gas inflamed by electricity, has just realized the hopes which we conceived at the time of its first appearance. A machine of six horse power, with two cylinders, operates, at the time we write these lines, the presses of the *Moniteur universel*.

THE seed of winter wheat retains its germinating powers from three to four years, of spring wheat two or three years, oats two years, beetroot six to seven, swedes turnips five to six.

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Manufacture and Qualities of English Pig Iron.

In a "Hand Book on the Industrial Exhibition," by R. Hunt, F.R.S., some very interesting information is given respecting iron. We learn from it that in 1750 the quantity of pig iron produced in Great Britain was only 30,000 tuns; now it amounts annually to 3,826,000 tuns, from 582 furnaces. Prior to 1826 there was a heavy duty on foreign iron, and at one period small quantities were sent from New England. The following is a description of the modes of smelting English ore, also the characteristics of the different kinds of pig iron :—

The first process in the metallurgy of iron is the calcination of the ore, which is effected either in kilns or in the open air, in heaps; the object being to remove carbonic acid, water, sulphur, and all substances volatile at a red heat. The next process is that of smelting the ore. The only flux employed is limestone, and the fuel is either coal or coke, or a mixture of these. "In commerce there are four principal varieties of cast iron, known respectively as Nos. 1, 2, 3 and 4, or dark grey, bright grey, mottled and white; these terms, although convenient, do not, however, indicate the intrinsic value of the iron thus denominated, as the variable qualities of ore, fuel and limestone, may exercise such an influence on the resulting crude iron, as to render a low denomination of one manufacturer of greater commercial value than a higher denomination of other makers. The general characters of the four varieties are these :—No. 1. Color, dark grey, in large rounded grains, obtained commonly near the commencement of the casting, when the furnace is in good working order and when an excess of carbon is present; in flowing it appears pasty, and throws out blue scintillations. It exhibits a surface where crystalline vegetations develop themselves rapidly in very fine branches; it congeals or fixes very slowly; its surface, when cold, is smooth, concave, and often charged with plumbago; it has but a moderate tenacity, is tender under the file, and susceptible of a dull polish. When melted over again, it passes into No. 2, and forms the best castings. No. 2. Color, bright grey, of small-grained structure, and interspersed only with small graphite laminæ; possesses great tenacity, is easily filed, turned and bored; may even be hammered, to a certain extent; does not readily crack from change of temperature. No. 3 is a mixture of white and grey iron. On strongly-mottled iron, little stars and spots of grey iron are found interspersed in bright or flowery iron; weakly-mottled iron exhibits white specks on a grey ground. In streaked iron, grey iron is found above and below, and bright iron in the middle, with strong demarkations. No. 4. White iron varies from tin white to greyish white; it is very brittle, cracking easily, even by change of temperature; it is extremely hard, sometimes even more so than hardened steel, so that it will resist the strongest file, and scratches glass easily. Fracture sometimes laminar, sometimes lamino radiating, sometimes finely splintered, sometimes dense and conchoidal. As the fracture changes from laminal to conchoidal, the color likewise varies from white to greyish. Mean specific gravity 7.5. Expands less than grey iron when heated, cannot be welded, because it becomes pasty at the very lowest welding heat. When heated to the melting point, it does not suddenly pass into the fused state, like grey pig iron, but is converted before fusing into a soft pasty mass.

In this variety of pig iron, the whole of the carbon is united to the iron; it is never used for casting, but always for conversion into malleable iron. The bright iron obtained from spathic iron ore contains the largest proportion of carbon (5. 3 per cent according to Kasten). A white iron is always the result of the derangement in the working of the furnace, though it by no means follows that, when the iron is white, the furnace must necessarily be in a disordered state; the presence of manganese, for example, has a tendency to make white cast iron; but the quality may be excellent. The white iron resulting from derangement flows imperfectly, and darts out, in casting, an abundance of white scintillations; it fixes very quickly, and, on cooling, exhibits on its surface irregular asperities, which make it extremely rough. It is exceedingly hard, though it is easily broken, the fracture being radiated and lamellar; the bar iron it affords is of inferior description. This kind of iron is always produced when the furnace is carrying a heavy burden of forge cinders, containing sulphur and phosphorus. Thus there are two distinct kinds of white cast iron. 1st. That obtained from ores containing a large proportion of manganese, crystallizing in large plates; this variety is highly prized for making steel. 2. That resulting from a heavy mineral burden, or from a general derangement of the furnaces, or from the rapid chilling of fused grey iron crystallizing in small plates; both are hard and brittle, the first more so than the last. Cast iron, which by slow cooling is grey becomes white when it is cooled rapidly. On the other hand, when white iron is melted and allowed to cool very gradually, a portion of the carbon crystallizes out as graphite, and grey iron is produced. In some iron works, six varieties of pig iron are recognized, which may be classified thus: 1st. First foundry iron, large crystals. 2d. Second foundry iron, large and small crystals mixed. 3d. Dark grey, all small crystals. 4th. Bright grey. 5th. Mottled. 6th. White, verging on mottled.

A GREAT PRIZE SHOOTING MATCH—NEW FRENCH RIFLE.

On the first week in July, for a few years past, British riflemen and several of the best marksmen from the continent of Europe, have assembled at Wimbledon, England, and contended for several prizes with the rifle. A hundred targets are set up, and the candidates for the prizes shoot at five separate distances, from 200 up to 1,000 yards. The "Queen's Prize" of $1,250 seems to be the object of the highest ambition to secure, and it is open to every volunteer soldier.

In the accounts given in the English papers of the late match at Wimbledon, it is evident that the method of counting is quite different from what is called "string shooting" in America. Here we count from the very center of the cross in a target by measuring the distance of each shot from it, and then reckoning the total distance of a certain number of hits from the center. In England, on the contrary, they have a system of reckoning by what is called "points and hits," as follows :—

"Captain Heaton, at 200 yards, 13 points, 5 hits; at 500 yards, 11 points, 5 hits; at 600 yards, 15 points, 5 hits." What a point means is not explained. The London *Times* states that this Captain Heaton, "at a range of 600 yards, succeeded in getting five bulls' eyes in succession." This shooting was afterward beaten, at the same distance, by Major Moir, who is stated to have "made 10 bulls' eyes in 15 shots." This reads like wonderful shooting, especially as it must be executed by the army Enfield rifle, the object of the prize being the encouragment of practice with the usual soldier's weapon. The size of the bull's eye in the English target, however, is not given. It may be several inches in diameter, and the hitting of it at such a distance may be no great feat in shooting, to a first rate American rifleman.

Hitherto the Scottish riflemen have excelled all others in the Wimbledon matches—the English, French, German and Swiss marksmen being found inferior to them. This year, however, they have been beaten by the English riflemen.

Eight representatives were selected by each country, and contended for a splendid shield made of iron and gold, having a medallion portrait of the Queen in the middle, and lower down a Highlander and English rifleman grasping hands. The score was 890 points by the English and 724 by the Scotch.

At this match M. Delvigne, of France, so well known for his improvements in rifles for the army, appeared not only as a spectator, but a participant in the contest, and did some good shooting with a peculiar rifle, having a barrel only 14 inches in length. Instead of the breech of the barrel being connected to a short stock, in the common way, and with the trigger and hammer so near the eye when the head is inclined in taking aim, the breech of the barrel was connected to the stock by a skeleton frame, and removed to a greater distance from the butt. The hammer was also placed forward, and connected to the trigger by a long slide bolt. This arrangement appears to be judicious, as we have known several cases in which hunters and others have received injury to their right eyes from splinters of percussion caps, on account of the hammer and nipple being placed so near the eye in the common gun stocks. There is considerable room for improvement yet in the stocking of rifles and other firearms.

Temperature of Chambers.

[From Hall's "Journal of Health."]

Human life would be prolonged, and an incalculable amount of disease prevented, if a little fire were kept burning on the hearth during the night, winter and summer, if the doors and windows are kept closed. One great advantage would be, that a constant draft would be kept through the room, fireplace, and chimney, making a great degree of atmospherical vitiation impossible. There is a baleful error in the popular mind as to the nature and effects of pure air, warm air, and cold air. Warm air may be as pure as that of the poles; and although cold air is almost a synonym of pure air, and although it is healthful to breathe a cold air asleep or awake, yet the breathing of cold air is healthful only to a certain extent. It is not true that because it is healthful to sleep in a cool room, it is more healthful to sleep in a very cold room, not only because, as has been previously stated, carbonic acid becomes heavy under a great cold, and falls from the ceiling to the floor and bed of the sleeper, but because also a great degree of cold in a room where one is sleeping is very certain to cause dangerous and even fatal forms of congestion in the brain and lungs. The same ailments result from keeping sitting or sleeping apartments overheated. In midwinter, the heat of a sitting room should not exceed sixty degrees of Fahrenheit, five feet above the floor. In the chambers of the sick in French hospitals, the directors are careful that there shall not be a greater heat than sixty degrees or about fifteen Centigrade. The temperature of a sleeping apartment for invalids and for children in health should range about fifty degrees in cold weather, and not run lower than thirty-five; there is no advantage in sleeping in a colder atmosphere. Five hundred cubic inches of pure air should be delivered to invalids and sleepers every hour, as is the custom in he best regulated French hospitals.

The Chemistry of Digestion.

Dr. Marcet, in a late lecture on this subject before the London Chemical Society said :—With respect more especially to the chemistry of digestion, it appeared that after a long fast the contents of the stomach were alkaline, and very small in quantity; and an acid reaction was perceptible. The object of the action of the gastric juice was, no doubt, to render the food capable of absorption; and accordingly it was found that albuminous, gelatinous, and other similar matters introduced into the stomach, became converted into a substance called "peptone," which, according to Lehmann, might be viewed as the same body, whatever nitrogenous food was employed; it had been shown, however, that the peptones resulting from the digestion of cartilage and the mucous membranes rotated the plane of polarisation of light, whereas peptones from albumen had not this power. The gastric juice, which was at first abundant, gradually diminished in quantity and became more acid, probably in order that it might act on the less masticated or less easily digestible portions of the food. Besides the conversion of the albuminous matter into peptone, another important change took place in the stomach, namely, the decomposition of the neutral fats and setting free of the fatty acids of food; this was an important decomposition, for the bile would form an emulsion with a fatty acid, but not with a neutral fat.

The Salt Manufacture of New York.

The Onondago salt springs in the vicinity of Syracuse, N. Y., are the source of considerable wealth to the State. Their annual product from January 1st, to July 5, 1862, was 2,258,183 bushels which is 760,804 bushels more than were produced during the same period last year. At one period a very indifferent quality of common salt was made, but the manufacture of it has greatly improved of late years and the best Salina table salt now equals that made in England. The Dairy salt, or, as it is called, "Factory Filled," is the best. This is manufactured from solar salt, by crushing it and putting it through a caloric process, which brings it to a fine, clear, dazzling white appearance, thus clearing it of all impurities.

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CENSUS STATISTICS OF 1860.

The preliminary chapters of the report of the census of 1860 contain a mass of statistics from which we have endeavored to gain a clear idea of the industrial condition of the country in that year. The first object to which men direct their labor is the procuring of food, as without this they perish in a few days. The next in importance is a dwelling in which they may be sheltered from the elements; the next is clothing, and the next fuel. If men are able to procure these first necessaries without working all of the time, they then direct their efforts to obtaining a great variety of articles usually termed luxuries which are less important but still pleasant to possess. In examining the industrial condition of a people, therefore, the natural inquiry seems to be first, "How are they fed, housed, clothed and warmed, and then to what objects do they direct their labor after these necessaries are supplied?" If the people are very stupid and ignorant they will work with poor tools and but few of their wants can be satisfied. In Ceylon, for instance, the only implement used by the brutal natives is a club, and their labor is sufficient to produce only the first necessary, food; they go entirely naked and sleep in the open air. The higher a people is advanced in intelligence, the more abundant and serviceable are the implements and machines with which they work, and the larger is the product of articles with which to supply their wants. This is shown where labor is divided, in a smaller portion of the community being engaged in the production of food and other necessaries, and a larger number in the production of various articles of convenience and luxury.

What is the condition of the United States in this respect? How many of our people are engaged in the production of food? With what implements and conveniences do they work? How many are employed in making clothing? How many in the production of luxuries? We turn to the mass of statistics already received from the Census Office to see if we can get answers to any of these questions.

THE NUMBERS ENGAGED IN AGRICULTURE.

In all countries, even in England, the production of food gives employment to a larger portion of the population than any other pursuit. The statistics for this country will doubtless be furnished in the full report, but they are not embraced in these preliminary chapters. We have, however, the statistics of the manufacture of

AGRICULTURAL IMPLEMENTS.

The total value of agricultural implements made in 1860 was $17,802,514, being an increase of 160.1 per cent upon the total value of the same branch in 1850, when it amounted to the sum of $6,842,611. This manufacture amounted in New England to over two and three-quarter millions of dollars—an increase of 65.8 per cent. In the Middle States the value was nearly five and a half millions, having increased at the rate of 122.2 per cent. In the Western States, where the increase was most extraordinary, the value of implements produced was augmented from $1,923,927 to $7,955,545. The increment alone in those States was, therefore, only a fraction less than the product of the whole Northern section of the Union in 1850, and was greater by 313 per cent than their own manufacture in that year. In each of the States of Ohio and Illinois, which are the largest manufacturers in the West, the value of the product exceeded two and a half millions dollars, being an increase in the former of 382, and in the latter of 235 per cent in ten years. Michigan, Indiana and Wisconsin increased their production of agricultural implements 1,250, 386 and 201 per cent respectively. While in some of the Southern States there has been a decrease. In Virginia, Alabama and Louisiana the increase in this branch has been large, and in Texas, which reported none in 1850, agricultural implements of the value of $140,000 were manufactured in 1860. The whole value produced in the Southern States in the latter year (including cotton gins) was $1,582,483, exhibiting an increase of over 101 per cent in the last decade.

FLOUR AND MEAL.

The product of flour and grist mills in 1850, reached a value of nearly one hundred and thirty-six millions of dollars, while in 1860 the returns exhibit a value of $223,144,369—an increase of $87,246,563, or 64.2 per cent in the last ten years. The production and increase of the several sections were as follows:—

	Value of flour and meal.	*Increase.*	*Per cent Increase.*
New England States	$11,155,445	$4,834,959	76.5
Middle States	79,086,411	10,653,232	15.5
Western States	96,038,794	53,364,802	125.0
Southern States	30,767,457	14,185,640	85.5
Pacific States	6,096,262	4,207,930	222.8

The largest mill is in Oswego, New York, which in 1860 produced 300,000 barrels of flour; the next two, in Richmond, Virginia, made 190,000 and 160,000, respectively; and the fourth, in New York city, returned 146,000 barrels. The value of annual production of each ranged from one million and a half to two million dollars.

CLOTHING.

The amount of labor devoted by the people of this country to the clothing of their bodies and feet is very fully shown under the several divisions below.

COTTON CLOTH.

The total value of cotton goods manufactured in New England was $80,301,535, and in the Middle States $26,272,111—an increase of 83.4 per cent in the former, and 77.7 in the latter. The remaining States produced to the value of $8,564,280, making the whole production during that year $115,137,926, against $65,501,687, the value of this branch in 1850, or an increase in the general business of nearly 76 per centum in ten years. In the States of Maine and New Jersey the manufacture increased in the same time 152 per cent; in Pennsylvania, over 102 per cent; in New Hampshire and Connecticut, over 87 per cent; in Massachusetts, nearly 69 per cent, and in Rhode Island 88.7 per cent. The total production in this branch was at the rate *per capita* of $3 69 for every individual in the Union, equivalent to 46½ yards of cloth for each, at the medium price of 8 cents per yard. The average product per head in 1850 was 32¼ yards. The increase alone has, therefore, been at the rate of 11 yards for each person, or nearly equal to the average annual consumption *per capita* in 1830, when it was estimated to amount to 12 yards. The number of hands employed in the manufacture in 1860 was 45,315 males, and 73,605 females, an increase in the male operatives of 10,020, and in the female of 10,944 since 1850. The average product of the labor of each operative was $969. The number of spindles was returned at 5,035,798, being an increase of 1,402,105, or 38.5 per cent over the aggregate in 1850, which was estimated at 3,633,693. The New England States possess 3,959,297, or 78.6 per cent of the whole, while Massachusetts alone employs 1,739,700, or 29.3 per cent of the number returned in the Union. The increase of spindles in the last decade was, in New England, 1,208,219, or 30 per cent. In the State of Maine, 186,100, or 163.3 per cent; in the State of New Hampshire, 229,484, or 52.1 per cent; in the State of Massachusetts, 451,609, or 35 per cent; in the State of Rhode Island, 141,862, or 22.7 per cent; in the State of Connecticut, 211,188, or 83.1 per cent; while in Vermont it exhibited a decrease.

The product per spindle varies in the different States, partly accounted for by the fact that many manufacturers purchase yarns which have been spun in other States.

The product of cotton goods per spindle is as follows:—In Maine, $22 12; Massachusetts, $21 12; New Hampshire, $24 87; Vermont, $18 13; Rhode Island, $16; Connecticut, $16 46. The average in the New England States is $20 30; in the Middle States, $30 48, and in the whole Union, $22 86.

The quantity of cotton used in the fabrication of the above goods was 364,036,123 pounds, or 910,090 bales of 400 pounds each. Of this amount the New England States consumed 611,738 bales, and Massachusetts alone 316,665. The consumption per spindle in that year in the various States and sections was as follows:—

	No. spindles.	*Lbs. cotton.*	*Lbs. per spindle.*
Maine	300,000	23,438,723	78
New Hampshire	669,885	39,212,644	58.5
Vermont	19,712	1,057,250	53
Massachusetts	1,739,700	126,666,089	72.8
Rhode Island	766,000	38,521,608	50.2
Connecticut	464,000	15,799,140	34
In New England	3,959,297	237,844,854	61.8
In the Middle States.	861,661	76,055,666	88.26
In the United States.	5,035,798	364,036,123	72.2

WOOLEN MANUFACTURES.

The returns of woolen manufactures show an increase of over fifty-one per cent in ten years. The value of woolen and mixed goods made in 1850 was $45,281,764. In 1860 it amounted to $68,865,963. The establishments numbered 1,909, of which 453 were in New England, 748 in the Middle, 479 in the Western, 2 in the Pacific and 227 in the Southern States. The aggregate capital invested in the business was $35,520,527, and it employed 28,780 male, and 20,120 female hands, 639,700 spindles and 16,075 looms, which worked up more than eighty million pounds of wool, the value of which, with other raw materials, was $40,360,300. The foregoing figures include satinets, Kentucky jeans and other fabrics of which the warp is cotton, though usually classed with woolens. In the manufacture of these mixed goods the amount of cotton consumed is 16,008,625 pounds, which, with 364,036,123 pounds used in making cotton goods, as previously stated, amounts to 380,044,748 pounds or 950,112 bales, exclusive of a considerable quantity used annually in household manufactures and for various other purposes.

The largest amount of woolens was made in New England, where the capital was nearly twenty millions of dollars, and the value of the product $38,509,080, but little less than the total value in 1850. More than half the capital, and nearly one half of the product of New England belonged to Massachusetts, which had 131 factories of large size. Rhode Island ranked next, and had increased its manufacture 163 per cent in ten years, that of Massachusetts being 48 per cent. The value of woolens produced in the Middle States was $24,100,488, in the Western $3,718,092, and in the Pacific and Southern $2,538,303. The sectional increase was in New England 52.1, in the Middle States 54, and in the South 107, the last showing the greatest relative increase. Pennsylvania, next to Massachusetts, was the largest producer, having 447 factories, which made $12,744,373 worth of woolen and mixed fabrics, an increase of 120 per cent. A value of $8,919,019 was the product of 222 establishments in the city of Philadelphia.

The State of New York holds the third rank in relation to this industry, its manufactures amounting to more than nine millions of dollars. The woolen manufactures of Maryland exhibit an increase of 86 per cent. In Ohio, which produced in 1850 a greater value of woolens than all the other Western States, there was a decrease on the product of 1850, owing, probably, to the shipments of wool to Europe, which, in 1857, was found to be the most profitable disposition of the rapidly increasing wool crops of that State. In Kentucky, now the largest manufacturer of wool in the West, the product was $1,128,882, and the increase in ten years 40.4 per cent; while in Indiana, which ranks next, it was 31 per cent, and in Missouri 18.8, on the product of 1850

The quantity of wool returned for the whole Union in 1850 was upward of 52,500,000 pounds. Sheep raising has been greatly extended and improved since that date in Ohio, Texas, California and other States, and the clip in 1860 amounted to 60,511,343 pounds; an increase of 15.2 per cent in ten years. The yield still falls far short of the consumption, and large quantities continue to be imported, notwithstanding the amount of territory adapted to sheep husbandry.

LINEN GOODS.

The manufacture of linen goods has made but little progress in this country. A few mills, chiefly in Massachusetts, make crash and other coarse fabrics; the largest two in that State produced six million yards in 1860. Others are extensively engaged in making twines, shoe and other threads.

FLAX COTTON.

The manufacture of fabrics from flax cotton has been commenced, and success in a new branch of industry is confidently expected. The inventive genius of our countrymen has perfected machinery for the preparation of flax for spinning, which can be furnished, it is alleged, at as low a rate as the product of Southern cotton fields.

SEWING SILKS.

The manufacture of sewing silks is extensively carried on in this country. Including tram, organzine, &c., the production exceeded five million dollars in the States of Connecticut, New Jersey, Massachusetts, Pennsylvania and New York, their relative values being in the order mentioned. Ribbons are made to a small extent, but the chief manufactures of silk consist of ladies' dress trimmings, coach lace, &c., of which the cities of Philadelphia and New York produce to the value of $1,260,725 and $796,682 respectively.

LEATHER.

The tanning and currying establishments of the United States produced in 1850 leather, exclusive of morocco and patent leather, to the value of $37,702,333. The product of the same branch in 1860 reached $63,090,751, an increase of nearly 67 per cent. In the New England States it was $16,333,871, in the Middle States, $36,344,548, and in the Western States, $5,986,457; being an increase of 66.6 per cent 90.7 and 13.3 in those sections, respectively. The Pacific States and Territories (including Utah), which returned no leather in 1850, produced in 1860 to the value of $351,469. The largest producers of leather are New York, $20,758,017; Pennsylvania, $12,491,631; and Massachusetts, $10,354,056; an increase in those States of 111.7, 98.4 and 82.3 per cent, respectively. Including morocco and patent leather the aggregate value produced in the Union in 1860 exceeded sixty-seven millions of dollars.

BOOTS AND SHOES.

The manufacture of boots and shoes employs a larger number of operatives than any other single branch of American industry. The census of 1850 showed that there were 11,305 establishments, with a capital of nearly thirteen millions of dollars, engaged in making boots and shoes to the value of $53,967,408, and employing 72,305 male and 32,948 female hands. The returns of 1860 show that 2,554 establishments in the New England States employed a capital only $2,516 less than that of the whole Union at the former date; and with 56,039 male and 24,978 female employes produced boots and shoes of the value of $54,767,077, or eight hundred thousand dollars more than the entire value of the business in 1850, and 82.8 per cent in excess of their own production in that year. Massachusetts increased 92.6 per cent, having made boots and shoes of the value of $46,440,209, equal to 86.6 per cent of the general business in 1850. The State of New York returned 2,276 factories, with an aggregate production of $10,878,797; and New England, New York, Pennsylvania and New Jersey together produced $75,674,946 worth of these articles, being 40.4 per cent more than the product of all the States in 1850, and 67.9 per cent more than their own manufacture in that year. The three counties of Essex, Worcester and Plymouth, in Massachusetts, produced boots and shoes to the value severally of about 14½, 9½ and 9¼ millions of dollars. The largest production of any one town was that of Philadelphia, in which it amounted to $5,349,887; the next, that of Lynn, Massachusetts, was $4,867,399; the third, Haverhill, $4,130,500; the fourth, New York city, $3,869,068. The largest production of a single establishment was of one in North Brookfield, Massachusetts, and amounted to over $750,000. This establishment was the largest of five the same proprietors had in operation that year, the total production whereof was over one million pairs of boots and shoes, valued at over thirteen hundred thousand dollars. Machinery propelled by steam power is now used in many large manufactories with highly satisfactory results.

INDIA RUBBER GOODS

Were made chiefly in Connecticut, New York, New Jersey and Massachusetts, to the value of $5,729,900—an increase of ninety per cent in the last decade.

DWELLINGS.

The value of the dwellings in the United States is not given in these preliminary chapters, but we have the amount of lumber annually produced, and the value of the household furniture manufactured.

LUMBER.

The sawed and planed lumber reached, in 1850, the value of $58,521,976, and in 1860 $95,912,286, an increase of 64 per cent in the last decade. The Western States alone, in the latter year, produced lumber to the value of $33,274,793, an increase of $18,697,543, or 128 per cent over their manufacture in 1850. The Pacific States and Territories produced to the value of $6,171,431, and the Southern $17,941,162, a respective increase of $3,841,826 and $9,094,686 in those sections, being a ratio of 162.7 and 102.3 per cent.

CABINET FURNITURE.

The value of cabinet furniture made in 1860 in the New England, Middle States and Ohio reached the sum of $19,553,734, an increase of 30.5 per cent over the product of those States in 1850, and exceeding the production of the whole Union in 1850. New York returned in 1860 furniture of the value of $7,175,060 (or 40.6 per cent of the whole amount made in 1850), Massachusetts $3,365,415, and Pennsylvania $2,938,503.

Next week we shall publish statistics of the pro-

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duction of various articles of luxury, and of various manufactures which are incidental to the production of articles intended for the direct gratification of our wants.

VALUABLE RECEIPTS.

ETCHING AND ORNAMENTING GLASS.—The hardest glass may be etched and frosted with a peculiar liquid acid, and also with this acid in the condition of vapor. When powdered fluor spar is heated with concentrated sulphuric acid in a platinum or a lead retort, and connected with a refrigerator by a tube of lead, a very volatile colorless liquid is obtained which emits copious white and suffocating fumes. This is hydro-fluoric acid, a dilute solution of which attacks glass with avidity while neither sulphuric nitric, or muriatic acid has the least effect upon it. In a diluted state it is employed for glass etching, for which purpose it is kept in a lead vessel, because it has very little affinity for this metal. The vapor of this acid is also used for the same purpose. The glass to be operated upon is first coated with a ground of wax, and the design to be etched is then traced through the wax with a sharp instrument. Into a shallow lead basin, some powdered fluor spar is then placed, and a sufficient quantity of sulphuric acid poured upon it to convert it into a thin paste. The glass to be etched is now placed in the basin to which a gentle heat is applied, when the vapor of the acid is disengaged and attacks the traced lines from which the wax has been removed. The operation is completed in a few minutes, the glass is removed and the wax cleaned off with warm oil of turpentine. All those parts which have remained covered with the wax are now clear as before, while the other parts drawn by lines to represent figures, have a frosted appearance. Any person can produce figures on glass with this acid, but it is dangerous to use, as it is poisonous in the state of a gas when inhaled, and exceedingly injurious to the skin, if allowed to touch it in the fluid state.

In October, 1859, a patent was granted to James Napier, of Glasgow, Scotland, for a very simple method of ornamenting glass with fluoric acid. Instead of drawing patterns and figures on the glass with the use of varnish and a graver to prepare the glass for etching, the glass is prepared by simply transferring pictures from prints, which can be performed by almost any person. The method is to take a print, lithograph or picture made with printer's ink, and fix the printed surface to the glass by any ordinary paste made from starch. All the air must be carefully excluded from between the print and glass. When perfectly dry, liquid hydrofluoric acid about the specific gravity of 1.14 is applied for about three minutes, when it is washed in water to remove the paper and the acid, and the figure of the print is then found upon the glass. The printed portion of the paper may also be cut in outline and pasted on the glass, then transferred. Glass that is "flashed" on the surface with another color may be treated in this manner, when a portion of the flashing or surface will be removed, and the picture will remain in color.

Our Copper Mines.

The Houghton, Lake Superior, *Mining Gazette* gives a review of mineral raised in the Portage Lake District during the six months ending the 31st of June last. The yield was as follows :—

Mines.	Tuns.	Lbs.
Quincy	670	1,052
Pewahie	502	1,076
Franklin	454	1,646
Isle Royale	303	590
Huron	65	1,900
Hancock	36	1,243
Total	2,033	1,507

To which should be added about 1,600 lbs. taken at the Albany and Boston mines before the suspension of work at that mine, making the entire amount raised 2,034 tuns 1,007 lbs. Compared with the same period last year it stands as follows :—

First six months in 1861	2,043 tuns	1,449 lbs.
First six months in 1862	2,034 tuns	1,007 lbs.
Difference	9 tuns	442 lbs.

This slight falling off is attributed to the impossibility of obtaining under-ground laborers in the month of May, on account of which some of the stamp mills had to remain idle.

MISCELLANEOUS SUMMARY.

THE MINES OF CHILE.—There are 609 copper and silver mines in operation in Chile. One thousand five hundred laborers are employed at the mines. Many establishments are furnished with all modern mining improvements. The total monthly yield of all these copper mines is found to be from 8,524,000 to 10,518,000 pounds of ores, returning from 16 to 34 per cent of pure metal. The general average is estimated at 25 per cent. The silver mines yield monthly about 30,000 pounds of ore, returning at the rate of 40 marks (20 lbs. weight) per box of 64 quintals ore. At all the mines in operation at present the works are regularly carried on. They all connect with the sea coast by means of cart roads, built and kept in order by the owners of the mines.

A PATRIOTIC INVENTOR AND MILLIONAIRE.—Elias Howe, Jr., the original patentee of the sewing machine, was present at the great Union meeting at Bridgeport the other day, and not only subscribed one thousand dollars toward aiding enlistments, but signed his name to the roll of volunteers, and proclaimed his intention to go into the field himself. Mr. Howe has manifested unwonted patriotism ever since the rebellion broke out, and many a soldier's family has been made comfortable and happy by his liberality.

POSTAGE STAMPS.—The United States postage stamps which are now so freely in circulation, besides having the amount of their value in figures upon the upper corners, may be readily recognized by their colors and vignettes, which are as follows :—

Amount.	Vignette.	Color.
1 cent	Franklin	Blue.
3 cent	Washington	Pink.
5 cent	Jefferson	Chocolate.
10 cent	Washington	Green.
20 cent	Washington	Black.
24 cent	Washington	Lilac.
30 cent	Franklin	Yellow.
90 cent	Washington	Blue.

THE *Railroad Journal*, which is good authority, estimates the value of railway inventions in the last forty years, in this country alone, to be twelve hundred million dollars. Yet the career of improvement seems as far as ever from having reached a limit. According to this estimate, what is the aggregate value of all the improvements which have been patented during the same period? Who can estimate it?

THE MANUFACTURE OF GOVERNMENT ARMS.—The armory in Springfield, Mass., makes 14,000 stands of arms a month. In a short time that establishment, with the five private shops in operation there, will be able to manufacture 35,000 guns per month. In a few months we shall be making first rate arms, better than the best Europe can afford, at the rate of 600,000 per annum.

THE WOOL CROP.—The product of wool in the United States is placed at 120,000,000 lbs., and it is estimated that the army demand will take up about 42½ per cent of our entire crop. The U. S. *Economist*, therefore, predicts an unusually heavy demand for the heavy grades, as during last year, and that the prices of such will be out of all proportion with those of fine grades.

THE BIBLE.—Dr. Hall, in his *Journal of Health*, speaking of the importance of inhabiting houses in their structure and situation favorable to health, refers as follows to the Bible :—

> There is more sound, practical hygiene, on the subject of healthy houses, in the 14th chapter of Leviticus, from verse 34, than in all the skulls of all the health commissioners and common councils of all the cities of christendom.

THE members of the French Parliament are paid at the rate of about $20 per day during the session; it is now proposed to give them a fixed annual salary of about $2,000.

BY the latest news from England we learn that there was only eleven weeks' supply of cotton in the country. The number of bales in Liverpool was only 260,000.

DEATH OF MARTIN VAN BUREN.—Martin Van Buren, the eighth President of the United States, died at his residence in Kinderhook, N. Y., on Thursday the 24th day of July, in the 80th year of his age.

A GOOD SIGN.—Over $4,000,000 worth of breadstuffs were shipped from this port to Europe during last week.

Correspondence

THE WORLD'S FAIR---AWARDS TO EXHIBITORS.

[From our Special Correspondent.]

LONDON, July 11, 1862.

This, the greatest day which London has seen for many years, is now drawing to a close, and I send you some interesting facts connected with it. This was the appointed time for announcing the decisions of the juries, and the names of those exhibitors to whom awards had been made. About one hundred thousand persons were drawn together for the purpose of beholding the pageant, and it was certainly a noble sight to witness such a host thus assembled as interested spectators in this great peaceful contest of industry and art.

The awards which have been made justify me in all that I had promised to myself respecting the exhibition, and more than I dared promise to our American exhibitors. I am now prepared to announce that while we have had but 98 actual exhibitors, we have had 55 first class, and 28 second-class awards, making no less than 83 altogether. They are as follows, with the names and articles as nearly correct as possible, under the circumstances :—

CLASS No. 1 : *Mining, Metallurgy and Minerals.*—J. Mosheimer received the Council medal for his collection illustrating the newly-explored mineral wealth of the Territory of Nevada. T. Meads, honorable mention for fine collection of native copper and silver, from Lake Superior; New Jersey Zinc Company, honorable mention for fine spiegel iron, produced from franklinite.

CLASS No. 2 : *Chemical products.*—Medals to Glen Cove Starch Company, samples of starch; for the excellent quality of products; H. G. Hotchkiss, wintergreen oil; Kingsford, silver-gloss starch; F. S. Pease, for petroleum, benzole from petroleum, coal-tar oil for illumination and lubrication. In a subdivision of the same class, the Philadelphia College of Pharmacy received a Council medal for a fine collection of North American vegetable drugs, and preparations made from them.

CLASS No. 3 : *Substances Used for Food.*—Glen Cove Starch Company, medal for maizena or corn starch used for food; exceedingly excellent for food. Hecker Brothers, medal for flour; excellence of quality. Stebbins & Co. receive honorable mention for good flour, and J. Waddell, honorable mention for good quality of indian corn.

CLASS No. 4 : *Articles of Wood.*—Blanchard & Brothers, medal for the spokes of carriage wheels.

CLASS No. 6 : *Carriages.*—Brewster & Co., medal for Phaeton of good workmanship and materials.

CLASS No. 7 : *Manufacturing Machines and Tools.*—Howe Machine Company, medal for their collection of sewing machines; A. Smith, medal for his loom for weaving tufted carpet; Wheeler & Wilson, medal for their circular-hook sewing machines. (Illustrated on pages 297 and 298, Vol. VIII. (old series) SCIENTIFIC AMERICAN.) Bigelow, for Goodwin, honorable mention for his machines for sewing boots and shoes, and for sewing round the toes; G. H. Sanborn, honorable mention for his cord and rope-making machinery; I. M. Singer, for his collection of well-constructed sewing machines; Wilcox & Gibbs, honorable mention for improvements in their sewing machines. (Illustrated on page 165, Vol. XIV. (old series) SCIENTIFIC AMERICAN). In a sub-section of this class, but catalogued as class No. 8, W. D. Richards received a medal for improved boot and shoe machinery, and honorable mention is made of the following : F. O. Degner, for a printing press; Sandford & Mallory, for a scutching machine for taking the fiber from the leaves of aloes, and P. H. Wemple for a machine with 18 adjustable drills.

CLASS No. 8 : *Machinery in General.*—I will premise, before giving the names of the exhibitors in this class, that they number 32, and they have received no less than 20 first-class (medal) and eight second-class awards, making 64 per cent, against 27 per cent of English exhibitors of the same class. They are as follows :—John F. Allen, New York, slide-valve gear; Wm. D. Andrews, New York, centrifugal

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pump; Blake & Brothers, New Haven, Conn., stone breaker, (illustrated on page 409, Vol. XIII. (old series) SCIENTIFIC AMERICAN); E. Conroy, Boston, cork cutting machine, (illustrated on page 345, Vol. I. (new series) SCIENTIFIC AMERICAN); Capt. Ericsson's hot air engine, (illustrated on page 268, Vol. XIII. (old series) SCIENTIFIC AMERICAN); A. G. Gibson, Boston, carriage coupling; John C. Goar, Jamaica Plains, Mass., belt shifter, (illustrated on page 384, Vol. III. (new series) SCIENTIFIC AMERICAN); C. L. Goddard, New York, burring picker; T. Hansbrow, California, pump, (illustrated on page 312, Vol. IV. (new series) SCIENTIFIC AMERICAN); Kershaw & Colvin, Philadelphia, cow milker, (illustrated on page 4, Vol. III. (new series) SCIENTIFIC AMERICAN); Lee & Larned, New York, steam fire engine, (illustrated on page 89, Vol. XIV. (old series) SCIENTIFIC AMERICAN); Charles Near, New York, dynamometer; David Parker, Manchester, N. H., steam washing machine, (illustrated on page 161, Vol. II. (new series) SCIENTIFIC AMERICAN); Pesant Brothers, New York, hot-air engine; C. T. Porter, New York, governor for steam engine, (illustrated on page 36, Vol. XIV. (old series) SCIENTIFIC AMERICAN); Richards, New York, steam indicator; John Ross, New York, portable grist mill; Henry Steel, Jersey City, steam pump; S. Wilcox, R. I., hot-air engine, (illustrated on page 161, Vol. IV. (new series) SCIENTIFIC AMERICAN); H. R. Worthington, New York, duplex pump. Second class prizes were awarded to C. H. Dennison, hot-air engine, John Dickinson, diamond millstone dresser, (illustrated on page 328, Vol. XIII. (old series) SCIENTIFIC AMERICAN). (The American inventor is G. Natcher, Indianapolis). J. J. Eckel, New York, combination press, (illustrated on page 360, Vol. III. (new series) SCIENTIFIC AMERICAN); A. M. Foote, lock umbrella stand; H. H. Packer, ratchet drill; Wm. Walcott, button-hole cutter; Warker & Eppenstein, New York, soda water apparatus; Wentworth & Davis, Burlington, Iowa, windmill.

CLASS No. 9: *Agricultural Machines and Implements.*—Batchelor & Son, medal for hand tools; Blanchard & Brown, medal for cotton planter; J. F. & W. Dane, medal for steel plows; Douglas Axe Company, medal for their forest tools; McCormick, medal for reaping machine, (illustrated on page 144, Vol. X. (old series) SCIENTIFIC AMERICAN); W. A. Wood, medal for his combined reaper and mower; also, Russell & Tremain, honorable mention for reaping machine; Kirby & Osbourne, honorable mention for reaper and mower; Levi Beardsley, honorable mention for hay elevator; R. Price, honorable mention for mop, (illustrated on page 53, Vol. VI. (new series) SCIENTIFIC AMERICAN).

CLASSES Nos. 10 AND 11: *Engineering, Military Accoutrements, Arms, &c.*—Medal for Colt's revolving fire arms.

CLASS No. 12 is a subdivision of 11, and of two exhibitors. F. E. Sickles received the medal for ingenuity in steam-steering apparatus, and W. H. Ward a medal for his night-signal telegraph.

CLASS No. 13: *Philosophical Instruments.*—Darling & Schwartz received a medal for the excellence and accuracy of their steel scales and straight edges.

CLASS No. 14: *Photography and Apparatus.*—Mr. Dexter received honorable mention for a series of busts of the Governors of States in America.

CLASS No. 16: *Musical Instruments.*—Steinway & Sons, New York, Council medal for powerful, clear and brilliant tone of piano, with excellent workmanship shown in a grand piano and a square piano of large dimensions; G. H. Hulskamp, medal for novelty of invention in sound board of piano, and for an important invention in violins. The American department was visited constantly by the best players on the pianoforte in London, and by some of the best French and German performers, and they all conceded superior excellence to the American-made pianos.

CLASS No. 17: *Surgical Instruments.*—R. Bates, medal for a number of small, ingenious instruments for the relief of stammering.

CLASS No. 23: *Fibrous and Textile Manufactures.*—Medal awarded to the Manchester, N. H., Print Work, for a collection of excellent printed goods, also honorable mention for woolen hosiery.

CLASS No. 25.—V. Wilkins, honorable mention for superior manufactures of hair and feathers.

CLASS No. 28: *Engravings and Prints.*—American Bank Note Company, New York, medal for the variety and security of their bank bills; Mr. Saxton, medal for new process of sealing official documents; S. Sweet, medal for making blocks for printing.

CLASS No. 32: *Cutlery.*—Medal to W. Blackwell for tailors' shears, and one to the Douglas Axe Company, for their good collection of edge tools. Two medals have been awarded to exhibitors for clocks, but their names I have not yet obtained; and two articles have received second, as well as first class awards. Most of these machines, implements and articles will tell favorably upon the industry of the nations. We are all gratified with the compliments paid to American inventions, and the consideration shown to our exhibitors. If I was able to spare time I could prove that we could lay claim to double the number of prizes, counting those inventions which have been introduced from America into Europe, and exhibited in other departments.

There are no prizes awarded for sculpture or painting, but American artists bear the palm, by general consent, in these arts. Story, Powers, Mosier and Kuntzee have furnished works of art of which our people may well feel proud; and Cropsey's "Autumn on the Hudson" has no superior in the whole exhibition.

Col. B. P. Johnson is here with us at last as the representative of our people. The part which he has taken to uphold the honor of our artizans, will be appreciated at some future day. Among the agriculturists of Europe he is highly esteemed, and you were right in urging his appointment as our commissioner.

Before the close of the exhibition you will be informed of such successes of individual inventors as will fully sustain the flattering awards of the juries; and though I shall probably return without any compensation for fifteen months' services to the cause, I shall feel proud and happy that I did not abandon the enterprise. Had I abandoned it last January, I know there would have been no possible show of American exhibitors in the great building in South Kensington, but now the ingenuity and skill of our people are known, felt and acknowledged.

Yours, JOSEPH E. HOLMES.

Boiler Explosion in Philadelphia.

MESSRS. EDITORS:—Thinking that a brief account of the boiler explosion which took place here on Monday last, may be of interest to your readers, we furnish you an account of the same. The boiler was of the upright cylindric form, with an internal cylindric firebox, the smoke outlet of the firebox being a short elbow rising from the crown plate of the firebox, and extending out at the side of the boiler opposite the fire door. The hight of the boiler was a little over eight feet, external diameter three feet, internal diameter thirty inches, hight of firebox about thirty inches, thickness of the internal cylinder seven thirty-seconds of an inch, thickness of external cylinder the same; the stays or braces from the internal to the external cylinders were twelve inches apart in the firebox, and three quarters of an inch in diameter screwed through both cylinders and riveted upon the ends; the outlet for the steam connection and safety valve was one and one-eighth inches diameter; the pressure of steam used was sixty pounds per square inch. At the time of the explosion the boiler was blowing off at the safety valve.

The boiler was set upon a plate which supported the grates, and was in the rear corner of the basement of a three-storied building on the south side of Callowhill street, below Fifth, with the base somewhat below the level of the ground, which had been excavated to make the ashpit. In exploding, it rose like a rocket through the three floors and roof of the building, and passing northwardly across Callowhill street, descended through a conservatory attached to an unoccupied theater building, known as "The Melodeon," into the cellar of the same, striking in its progress the peak of the gable wall of the building west of the theater.

Upon examining the boiler where it lay, there was nothing in its appearance to indicate that the plates had been overheated, or that the water was low; the cylindric sheet of the firebox had been torn in a line parallel with the base of the boiler, for about one half of its circumference on the side opposite the fire door, and directly across the vertical seam of the firebox, and had bent inward or collapsed in such a manner as to close the smoke outlet; the contents of the boiler having no other means of escape, by reaction drove it like a rocket in the manner already stated; the stay bolts were torn from their insertions in the firebox, and the external shell of the boiler was considerably bent by the obstacles that it struck in its course; the fractured iron was laminated in appearance like a piece of paste board that had been macerated, and then torn exhibiting in some laminae a fibrous, and in others a granuler appearance. The boiler was about four months old, and had been made to order, and was of a neat and workmanlike finish. W. BARNET LE VAN.

S. LLOYD WIEGAND.

Philadelphia, July 26, 1862.

Separating Gold from Sulphurets.

MESSRS. EDITORS:—You will please send to my address your valuable paper, the SCIENTIFIC AMERICAN. It is the paper of all others that we here need, where so much fine gold is lost or not saved, for the want of knowing how to save the gold in the sulphurets which are found in the lodes, and are crushed in the mills of this mining region. If you know of any practical way of saving all the gold from the sulphurets, you would oblige many miners by giving information on the subject. We would be glad to have your opinion on the following inquiries. Quicksilver we know sublimes at 660°; now we wish to know if it will evaporate or pass off at a lower temperature in the open air, or in boiling water? It is contended here by some that if a portion of lead be placed in mercury, and an amalgam formed, that the lead cannot be separated by retorting, but that the lead will distil over with the quicksilver. Is such the fact? JAMES H. THOMAS.

Central City, Gilpin County, Colorado Territory.

[An extremely slow evaporation of quicksilver does take place at temperatures below its boiling point, and some eminent chemists believe this to be the case with all substances, even iron. Mercury can be separated from an amalgam of lead by distillation, or as it is more properly called by sublimation. We do not at present know of any better means of separating gold from the sulphur which is formed with it in the rocks, than simply exposing it to the air. After the pounded quartz has been run through the amalgamators, spread it on the ground a few weeks or months, and then run it through again; and repeat the process as long as it pays. If any of our readers are aware of a better method, we should be pleased to publish it. Roasting would doubtless drive off most of the sulphur, but it would be expensive.—EDS.

A Ball Balanced on a Jet of Water.

MESSRS. EDITORS:—I noticed in No. 4 of the current volume of the SCIENTIFIC AMERICAN, under the title, "A Ball Resting on a Jet of Water," this question—"How do you account for it?" As the explanation there rendered, was not satisfactory to me, having had for several seasons a small fountain in operation, whose jet supported a ball, I beg leave to offer the following in answer to the above question: the ball is driven upward by the force of the ascending water, but does not balance or rest directly over the jet and form a cup for its retention. On the contrary, the ball usually rests upon the jet, about half way from the center to the circumference. The jet attracts the ball, whose surface is wet, the same as two drops of water attract and unite with each other; and is drawn into the current, and becomes a part of the ascending column, the same as large drops of water would be, were they fed into the jet horizontally or at right angles. Again, the impetus of the jet striking the ball one side of its center, causes in the latter a rotary motion; the velocity corresponding with the weight of the ball. The rotary motion of the ball causes the water which surrounds it to be thrown off in a tangent, from the surface attaining the highest velocity, excepting that part in contact with the jet, which becomes loaded or heavier than other portions of the ball; in effect changing the center of gravity in the ball, drawing it nearer to the jet, and within the circle of the base or support, while the center of motion in the ball is very little changed. Although the ball revolves, or by a gentle wind is blown from one side of the jet to other, or rests directly upon its center,

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the principle is the same. The center of gravity is maintaincd nearly at one point by adding to or throwing off water, which being heavier than the ball gives to us one of Nature's beautiful specimens of balancing. S. B. P.

New York City.

The Alembic, or Still.

This is one of the most ancient of chemical instruments; so old is it, that the name of its inventor is lost in the lapse of time. The word "alembic" was coined by the alchemists, who prefixed the Arabic article *al* to the Greek word *ambix*, a pot or cup, which rather describes the form than the use of the vessel. Our word "still" is given to the instrument from the Latin *stillare*, to drop, to trickle down, to distil. Dioscorides, Pliny, and other writers of classical antiquity, speak of it as the ambix: the former says, "Mercury is quickly divided from cinnabar by the ambix;" which means simply that, by distilling cinnabar, mercury is separated from it.

The vapor of water rises from the earth during the warmth of the day, and is condensed during the cold of the night upon the surrounding plants and flowers; these are the dewdrops that sparkle in the morning. This is a process of Nature's distillation, and is familiar to every reader of the Bible—"My speech shall distil as dew" (Deut. xxxii. 2). "The clouds distil on man abundantly" (Job xxxvi. 28).

The principle of action of the still, whether of the oldest or most modern form, is identically the same; but the development of its use is ever progressive from age to age, and in our day it is utterly impossible to set a limit to its value as an instrument of progress and civilization. The power of steam was doubtless learned from experiments with the alembic. The gas which illuminates our streets and houses is a result of the still, and many other inventions have sprung out of it.

There are two kinds of distillation—the one, called "destructive," because by it a new transformation of the materials is evolved, and a substance produced which may be said not to have existed before; the other, "analytical," because by it we only separate substances, which before being put into the still were merely, as it were, mixed together. These remarks refer more particularly to the latter; and I therefore describe the still or alembic as consisting of three several parts, perfectly simple, like all great inventions, yet producing wonderful results. First, the boiler, which will hold the materials for distillation; second, the still-heads, which gather together the vapor arising from the boiler; and thirdly, the worm pipe, or condenser of the vapor, which passes into it. In practice the three parts are put together. The head, which is put on to the boiler, terminates with a nozzle or beak; to this is fixed the worm, which is twisted, corkscrew fashion, into a tub or bucket, with the end peeping out like a tap in a barrel. The bucket is kept full of cold water; then, as the vapor rises from the boiler and passes into the worm pipe, it is condensed into drops of liquid. There was a time when an apartment existed in all well-to-do houses, called the still-room. Here were drawn distilled waters and cordials, which were dispensed as specifics for maladies to guests and dependents. But now this has passed away; nevertheless the still-room maid maintains her name. Shakspeare, in one of his sonnets, terms the perfume distilled from flowers "the liquid prisoner"—

> Were not summer's distillations left
> A liquid prisoner, pent in walls of glass,
> Beauty's effect of beauty were bereft,
> Nor it, nor no remembrance what it was;
> But flowers distilled, though they with winter meet,
> Leese but their show, their substance still lives sweet.

Though the Arts obtain perfumes, turpentine, gas, ether, creosote, and a thousand other materials absolutely necessary for their existence, yet by distillation we obtain one more, which of earthly materials influences our destinies for good or evil far above others, and that is—alcohol, or, as we term it, "spirit." The word alcohol is probably of Arabic origin, though it is also said to have been coined by the alchemists, like the word alembic, by prefixing the Arabic article *al* to a Greek word, and to be derived from *koos*, the highest throw of the dice, believing its discovery to be no less than that of the "Elixir of Life," the one great aim of the alchemists of old, the name it still preserves in *eau-de-vie*. If wine be put into the boiler, and the several parts of the still be put together, and then heat be applied to the liquid, in a short time drops of a peculiar fluid, differing from wine, will shortly come from the still worm, this fluid being pure alcohol or spirits of wine. Model stills for instruction and amusement are made in Germany, and are to be procured at most of the large toy warehouses. With it young chemists, during the season of flowers, may revive the ancient arts of the still room.—*Septimus Piesse.*

Take Care of the Feet.

"Of all parts of the body," says Dr. Robertson, "there is not one which ought to be so carfully attended to as the feet." Every person knows from experience that colds and many other diseases which proceed from colds, are attributable to cold feet. The feet are at such a distance from "the wheel at the cistern" of the system, that the circulation of the blood may be very easily checked there. Yet, for all this, and although every person of common sense should be aware of the truth of what we have stated, there is no part of the human body so much trifled with as the feet. The young and would-be genteel footed cramp their toes and feet into thin-soled, bone-pinching boots and shoes, in order to display neat feet, in the fashionable sense of the term. There is one great evil, against which every person should be on their guard, and it is one which is not often guarded against—we mean the changing of warm for cold shoes or boots. A change is often made from thick to thin-soled shoes, without reflecting upon the consequences which might ensue. In cold weather boots and shoes of good thick leather, both in soles and uppers, should be worn by all. Water-tights are not good if they are air-tights also; india rubber overshoes should never be worn except in wet splashy weather, and then not very long at once. It is hurtful to the feet to wear any covering, that is air-tight over them, and for this reason india rubber should be worn as seldom as possible. No part of the body should be allowed to have a covering that entirely obstructs the passage of the carbonic acid gas from the pores of the skin outward, and the moderate passage of air inward to the skin. Life can be destroyed in a very short time, by entirely closing up the pores of the skin. Good warm stockings and thick soled boots and shoes are conservators of health, and consequently of human happiness.

Plants Consecrated to the Heathen Gods.

The ancients delighted to idolize and to symbolize objects. They placed gods and goddesses in the cups of flowers; and we may trace in our own sympathies toward certain plants, the still lingering remains of heathen mythology. The fig tree was in the early ages dedicated to Saturn; the oak to Jupiter; the ebony to Neptune; Daphne laurel to Apollo; thyme to Mercury; the vine to Bacchus; the poplar to Hercules; reeds to Pan; the lotus to Harpocrates, the God of Silence; poppies to Morpheus, whence the active principle of poppies or opium is now called morphia; the lilly was dedicated to Juno; the olive to Minerva; the myrtle to Venus; corn to Ceres; garlands of flowers and nosegays to Flora; orchards and fruit trees to Pomona; the white rose to the Nymphs; sea-weed to the Nereides; separate trees and trunks of trees to the Hamadryads and Dryads; the lilac to Hebe; the crocus or saffron to sickness; the laurel and palm to Glory and Courage. The violet, the forget-me-not, and many other flowers have still their symbols.—*Septimus Piesse.*

Impudence of the London "Times."

The following is almost too impudently cool to be seasonable or endurable. Read what the "Thunderer" says:—

The dividend on the Virginia State debt, due here in sterling on the 1st instant, has not been paid, the answer being "no funds." This result is only such as must have been apprehended since the State is overrun and its capital besieged by the Federal forces. It is to be hoped, however, that when these forces shall have occupied Richmond, and assumed control of the property of the State, the authorities at Washington will recognize that in seizing the property they must also assume its liabilities, and that their first duty is to see to the payment of those foreign claims which they have prevented the secessionist officials from discharging.

New Hampshire Manufactures at the World's Fair.

The London *American* gives the following account of the Manchester, N. H., products at the Great Exhibition. It says:—We were much interested in the Delane prints and ladies' hosiery exhibited by the Manchester Print works, Manchester, New Hampshire. These fabrics are justly attracting much attention. Although European countries display a larger assortment of this kind of goods, we very much doubt if more excellent fabric, in texture, manufacture, or beauty in design and colors can be seen in the Exhibition building. In comparing the manufacturers' list of prices we observe that they are less than inferior goods of this class are selling for in London. Heretofore Europe has found a profitable market in America for ladies' dress goods, but it seems Manchester, in America, is now able to compete with her without the aid of tariffs. Quite a number of European ladies have applied to the Commissioner from New Hampshire, the Hon. Frederick Smyth, for dresses of these American fabrics, at the close of the Exhibition. We hope the request will be granted. On the same tables are very superior bleached and unbleached shirting and skirting, manufactured by the Langdon Mills, Manchester, New Hampshire.

Agricultural Exhibition in Canada.

An exhibition is to be held at Toronto on the 22d, 23d, 24th, 25th and 26th of September. The managers say it is absolutely necessary to the conducting of the Exhibition, that the entries should be completed some time before its commencement; therefore parties intending to compete in any of the classes must fill up a form which will be supplied to applicants, and return it, together with one dollar for Membership, to the Secretary of the Agricultural Association, Toronto, on or before the following-named dates for the respective class, viz:—Horses, cattle, sheep, swine, poultry, on or before Saturday, August 16th. Grain, field roots and other farm products, agricultural implements, machinery, and manufactures generally, Saturday, August 30th. Horticultural products, Ladies' work, the fine arts, &c., Saturday, September 13th. No entry will be received after these dates, for the various classes.

English, American and French Hospitals.

An effort is being made in Paris to escape the unfavorable comments of the world with regard to the larger proportionate mortality of the French hospitals in comparison with American and English, by stoutly and plumply denying credit to the statistics of the latter. It is notorious that the English have done the same by the Americans for a long time.—M. Briquet, the French champion, says that he believes American statistics less than all the others. He illustrates the folly of trusting such evidence, by alluding to M. Malgaigne's remarks with reference to the Massachusetts Hospitals—"Now," says M. Briquet, "there is not a town in America which bears that name!"

A Word to the Wise.—Reasonable inquiry we are always willing to answer, but when a person remits a single dollar, ostensibly for the Scientific American, but really for the purpose of availing himself of our time and service to give him information worth ten times that sum, and especially if he omit to inclose a stamp for return of postage, he is liable to be disappointed.

The last official reports of the strength of the steam navy of France show that that power has three hundred and sixty war vessels propelled by steam, of which number one hundred and seventy-two are in commission and thirty are iron-clads. Ten iron-plated ships are being built, each carrying thirty-six guns, besides the six iron frigates and twelve floating batteries now complete.

The number of medals at the London Exhibition awarded is nearly 7,000, and of "honorable mentions" there are 5,300, which amount together to about one-half the whole number of exhibitors. In the Exhibition of 1851, the jurors were more sparing in their awards of 3,000 medals among 17,000 exhibitors. Of those medals, 170 only were awarded to the higher class.

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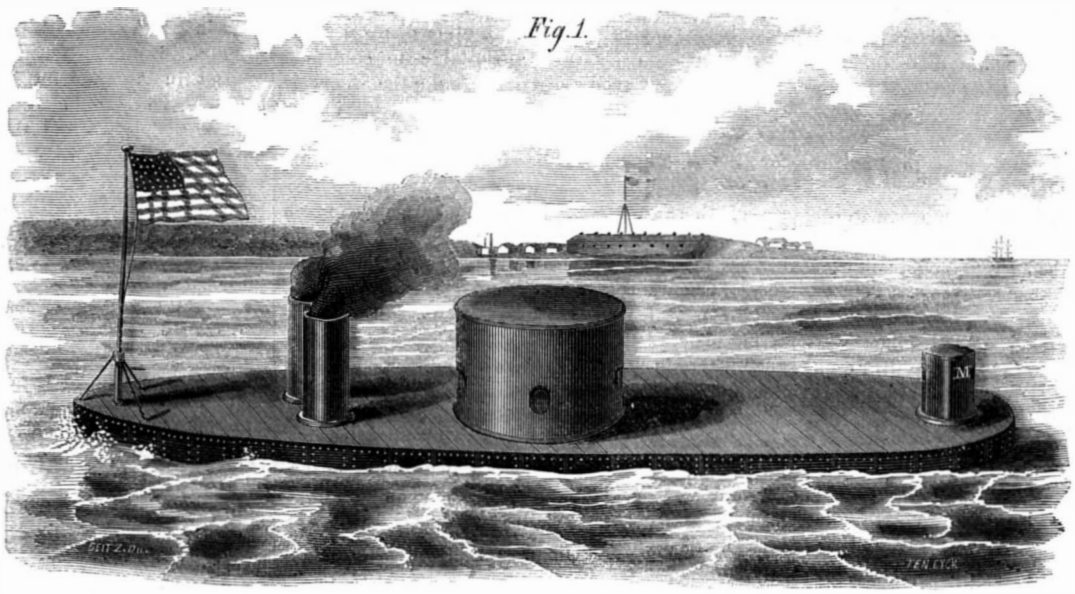
An Improved Monitor.

Among the numerous designs for improved ships of war is one invented by S. L. Denny, of Christiana, Pa., and we give an illustration of it in the annexed engravings, of which Fig. 1 is a perspective view, Fig. 2 is a vertical, and Fig. 3 a horizontal section.

While this battery, in its external appearance resembles the Ericsson battery, *Monitor*, very much, its internal arrangement widely differs from it. The Denny battery has an external and internal turret, as will be seen in Fig. 2. The external turret does not revolve as does that of the Ericsson battery but is built firmly to the boat or whatever foundation it is placed upon, and is pierced with four portholes, it being intended to carry four of the largest-sized guns. The internal turret, A, has a large boss, B, which fits into the large flange, C, inwhich a circular groove is formed to receive balls or rollers upon which the center ef the turret is supported and carried around. A circular track, E E, extends around under the inner turret near to its outer edge, upon which the wheels, F F, travel and carry a large portion of the weight, a large shaft passes through and is keyed fast in the center of the revolving turret, on the lower portion of which suitable gearing is placed by which it is made to revolve.

Fig. 1.



DENNY'S DOUBLE-TURRET STEAM BATTERY.

The inner turret is as perfectly shot proof as the outer one, and is pierced with four portholes which correspond with those in the external turret. The vertical wall of the internal turret extends only as much above the ports as is necessary to secure the requisite strength to make it shot proof.

To prepare for action, the guns are charged and placed in the position of gun, P, Fig. 2, the port in the external turret being brought into proper range, the internal turret is revolved until its port comes in range with the other, when the gun is moved forward and fired. It recoils and allows the turret to move thus clos ing the port against the entrance of the enemy's shot. The four guns can all be discharged in a very short time, when they can all again be loaded with the ports closed, securing perfect safety to the gunners. The ports may be so positioned that those at the unexposed side may be open to admit air and light while the guns are being charged.

Fig. 2.

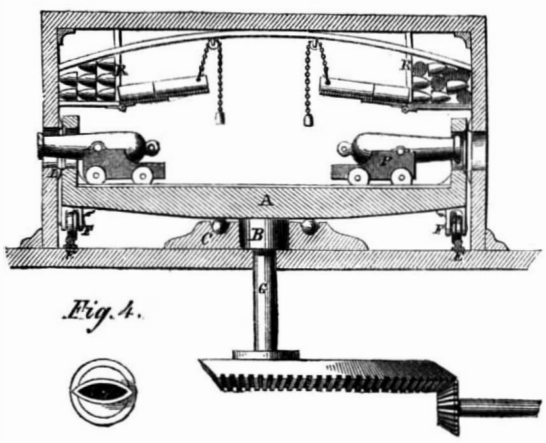
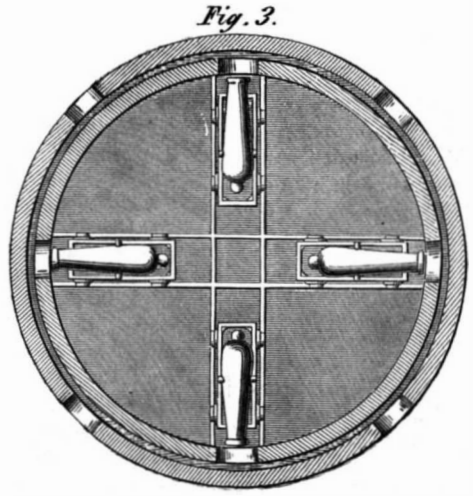


Fig. 4.

Fig. 3.



Magazines may be constructed as shown at R R, to contain a supply of shot for a protracted engagement, and the shot may be rolled into the guns by means of the troughs, S S, which are raised and lowered by the chain and weight. The troughs are made telescopic so as to be lengthened or shortened to accomodate them to the recoil of the gun. The labor of lifting the heavy shot to the muzzle of the gun is thereby avoided, and the loading greatly facilitated. This is deemed a feature of considerable value, as the difficulty of handling shot of great weight is regarded by our ordnance officers as now forming the limit to the size of cannon, as will be seen by Capt. Rodman's reports heretofore published in the Scientific American.

The inner face of each port in the external turret has a fillet around it, as shown at L, which will prevent portions of shells from getting into the space between the two turrets of a size that would interfere with the revolving of the inner turret.

The tower or wheelhouse, M, and also the smoke stack are intended to be of an oval shape, as shown in Fig. 4, and are supported and made to revolve on a circular flange secured to them so that they can be set in a position that the enemy's shot can take but little effect upon them.

The inventor says, "It is very evident that the turret principle to be employed successfully against the missiles of the largest sized guns now being made, to say nothing of what may be made in future, will have to be constructed of much greater diameter to carry the largest guns that can be made, as well as their walls of much greater thickness to resist the penetrating power of such large shot. It is equally evident that such a turret with its enormous weight of armor and guns cannot be made to revolve successfully upon the principle of the *Ericsson* battery; but by making the external turret stationary in the manner shown here this difficulty is removed, as the internal turret with its guns, &c., can be made to be worked with all the ease and certainty that could be desired, and the four guns all fired through the one port with the greatest facility and security to the gunners."

We are receiving letters from quite a number of our old New Orleans patrons. One of a recent date in which the writer inquires the condition of his patent business which was in progress when mail communication was stopped, says, "I have been loyal while in the midst of rebellion," and refers to a number of influential gentlemen in New Orleans to confirm his assertion. We have always contended that the inventors were loyal wherever they were, all over the Union, and such letters as this from the South confirm our opinion.

The Denver City *News* says that the mining season is opening up with the most flattering prospects for a large yield of gold. The quartz mills are all running, and invariably doing well.

WATER POWER FOR SHIPPING PORTS.

Where fuel is very cheap the steam engine is the most convenient and economical motor, but in many situations water power is capable of being economically applied for purposes that would involve an enormous expenditure for steam power. For example, in a shipping port it is very convenient for loading and unloading vessels to employ powerful cranes or derricks, but as it requires a very large amount of power to work them, and as they are not employed regularly, but are worked for an hour or two very rapidly and then allowed to remain idle for a considerable period of time, it involves a great waste of fuel to keep up steam in the boiler, and also considerable expense for the attendance of a fireman and engineer upon an engine. It is very apparent that if water could be employed for the same purpose, and by the turning of a valve on a pipe at each dock a supply of water under a high head could be had to operate a crane, a most efficient and economical power would thus be provided, because there would be no expense incurred when this power was not used, and it would be ready at any moment, night and day, for application. In any shipping port supplied with water from a high head, such a power is attainable. This is not a mere auggestion as to the practicability of thus applying water power, for it has been done already by Sir William Armstrong at Newcastle-upon-Tyne, England.

A New Model Howitzer.

The Pittsburgh *Dispatch* says that in the lot of howitzers now being cast at the Fort Pitt Works, an entire change of model has been introduced. The howitzers are of eight-inch caliber, the bore terminating in a long elliptical chamber. On the exterior surface, about eight inches of the breech is turned in a straight line, parallel to the bore, the end of the breech being formed with a regular curve. From the plane surface of the breech, seventeen inches in diameter, the piece tapers regularly to fifteen inches at the muzzle, without bands or projections of any description. The new howitzer is not much more handsome than the old model, but is probably more in accordance with the principles now adopted for ordnance. The greatest alteration, however, is in the bore, the old howitzer having a chamber at the breech, for the light charge of powder, of about half the caliber bore, and always troublesome in loading. The new pieces, of which the firm is now making fifty, have no chamber properly speaking, the bottom of the bore being formed of a pointed ellipse, somewhat resembling in shape a conical shot. The new howitzers are also cast on a hollow core, while those of the old model were cast solid.

The Lake Superior *News* and *Miner's Journal* states that a party of English miners visited Ontonagon before the Revolution and commenced a mining village which was afterward deserted. A copper kettle supposed to be left behind by them was lately found flattened and much carroded beneath the roots of a tree.

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VOL. VII. NO. 6.....[NEW SERIES.].....*Eighteenth Year.*

NEW YORK, SATURDAY, AUGUST 9, 1862.

THE INDUSTRIAL CONDITION OF THE UNITED STATES IN 1860.

The eighth census of the United States was taken in 1860. The inquiries embraced not merely the number of persons, but also the number of domestic animals and a great mass of statistics in relation to the industry of the people. Since the returns of the marshals were made at the Census Office in Washington, the Superintendent, C. G. Kennedy, Esq., has been busily at work arranging them for publication, and the preliminary chapters of his report have just been issued. They contain statistics from which we have prepared a general view of the condition of the country when the census was taken, that will be found on another page.

In 1607 the first permanent English settlement on this continent was made at Jamestown, in Virginia, and during the 255 years that have since elapsed a steady stream of immigration has poured across the Atlantic, while the descendants of the earlier settlers have been constantly multiplying, producing an aggregate population in 1860 of 31,749,281.

The continent at the time of its settlement was principally covered with a dense forest and most of the settlers were poor, but they were eager to improve their condition by industry and economy, and they had the sagacity and resolution to found and maintain a republican government which secured the most perfect protection of life and property at the smallest cost, while it left the citizen untrammeled by restraining enactments to pursue his own well-being, under the stimulus of free competition and the natural laws of trade. At the same time the founders of the Northern States most wisely made provision for the general education of the people. The combined industry of the nation, thus guided by intelligence, protected by law, unburdened by taxation and left free in its development, produced results which are accurately shown by the census statistics, and which have never been equaled in the same length of time and from the same beginnings. The continent has been cleared of its forest, made into cultivated farms, covered with comfortable dwellings, reticulated with roads, canals and railroads, and otted all over with opulent cities. The mass of he people are supplied with food, clothing, dwellngs, and other means of comfort and enjoyment immasurably superior to those of any other people tht ever existed.

Unfortunately a few negro slaves were imported int the country from Africa and their descendants nownumber 4,441,765, of whom 3,953,760 are still slavs, the others being free. In the Northern Stats the slavery system was soon abandoned, but in th Southern States it has been cherished, and as the ontrolling sentiment in those States was opposed o popular education, the two evils together —the avery of the blacks and the ignorance of the whites-have generated a state of society which seems to be ncompatible with the free institutions that have caed our prosperity, and which has resulted in a desperte effort to overthrow them. If this effort succeedsno future census will exhibit so satisfactory results asthose of 1860, for our wealth will decline, like thatof the Grecian, Italian, and all other republics aer their institutions were overthrown; and even i the effort does not succeed, it will inflict a very serius check on the prosperity of the country. The lessons of the war will cause a great augmentation of the naval and military force, which, with the interest on the public debt, will multiply the taxes; burdening the industry of the people with a load that will powerfully tend to repress the growth of our wealth. For a generation to come the censuses will probably exhibit a much less rapid advancement than that which is shown by the eight that have been taken.

Each year, however, from the increase in machinery and improvements in the modes of operation, we are able to produce a larger amount of wealth than during the previous year, and if the rebellion is pretty quickly subdued, we shall soon pay off the national debt and resume the multiplication of our means, probably with greater rapidity than ever before.

THE LONDON EXHIBITION---AWARDS TO AMERICAN EXHIBITORS.

The communication of our London correspondent, Mr. Holmes, on another page, contains a very full and interesting account of the awards of first and second-class prizes to American exhibitors at the World's Fair. We feel highly gratified with the success which has attended the efforts of our inventors. In proportion to their numbers their productions excelled those of all other countries under similar classes, and particularly so in mechanism. It is an unquestionable fact that in labor-saving machinery more progress has been made in America during the past quarter of a century, than in any other country, and this has been felt and acknowledged by British mechanics, and to an unlooked-for extent by the English press. It is also gratifying to learn, as stated by our correspondent, that a number of our exhibitors have been successful in a pecuniary sense in disposing of their patented inventions to good advantage. They have thus opened up new avenues of trade in Europe to other American inventors who may profit by their example.

The Superintendent of Machinery, D. K. Clark, C. E., an inventor and author of the well-known work "Clark's Railway Machinery," paid the American exhibitors extraordinary attention. It appears to us that the troubles of our country led the authorities connected with the Exhibition to treat our exhibitors with more favor than they would have done under other circumstances, for it was distinctly stated, at the outset, that no awards would be made to any country which refused to appoint a Commissioner. This rule was waived in favor of American exhibitors, and no distinction has been made between them and the English themselves. Undoubtedly this courtesy and kindness were due chiefly to the efforts and influence of our correspondent, Mr. Holmes, who has arduously devoted his time and energies to the cause. He stated to the Royal Commissioners that the American exhibitors who had forwarded articles to the World's Fair did so in good faith that their Government would appoint a Commissioner, and upon this candid statement a department was allotted for their products, and every proper consideration extended to them, although no Commissioner was appointed by our Government. Thus, out of ninety-eight actual exhibitors, no less than eighty received awards; but out of thirty-two exhibitors of "machinery in general," no less than twenty eight secured prizes. Never before have so many laurels been won in any industrial contest by a proportional number of candidates. It was perhaps fortunate that the majority of these inventions had been illustrated and described in the columns of the SCIENTIFIC AMERICAN, and that a knowledge of their merits had thus been previously disseminated among European mechanics and manufacturers.

It affords us much pleasure to state that the British Commissioners and the Juries have treated our exhibitors with marked kindness.

AN OPENING FOR A GREAT DISCOVERY.

It is well known that iron deposited by the electric current is generally destitute of solidity or strength. We are informed, however, by Mr. L. L. Smith, of College Point, Long Island, an experienced electroplater, that he has seen iron deposited by the battery solid, tough and fine grained. Mr. Adams, of Brooklyn, showed him a piece of this character an eighth of an inch in thickness.

Now, the forces of nature are invariable in their operation, and if the same conditions which produced that piece of iron can be again combined, they will inevitably produce the same result. It is certain that good iron can be deposited by the battery, all that remains is to learn the method by which it can be done.

If this art can be found the discovery will be one of the most valuable that has ever been made. There are a great many places in which it is desirable to have pieces of wrought iron of such size and form that they are exceedingly difficult to forge, but which could be fashioned with the greatest ease if iron of the desired quality could be deposited by the battery. It is conceivable, even, that the model of a vessel might be built up in a light framework of thin boards, and placed in a great dock or basin which could be filled with the iron solution, and that thus an iron ship of any desired capacity, with its sides, beams, decks, and armor plates, could be formed in a single piece! As tide wheels might be used to drive magneto-electric machines, the process would perhaps be cheap even if it required months or years to complete the deposit.

Should not this magnificent idea be realized, there are innumerable more modest applications in which the art of depositing iron by the battery would be of incalculable value, and as it is certain that the result is possible, we know of no more inviting field for exploration by our men of science.

THE PHOTOGRAPHIC ART A BLESSING TO THE WORLD---CARTES DE VISITES.

Of all the arts the one that seems most miraculous is photography. That the rays of the sun, darting through space with a velocity of a hundred and ninety-two thousand miles in a second, should, after bounding and rebounding from the walls of a room millions of times, till they cross each other in every conceivable direction, be directed upon a bit of paper and made to print a likeness accurate in all its microscopic details, would certainly have been deemed impossible before it was done, and yet there are large numbers of persons who by the daily performance of this miracle obtain bread and meat for themselves and little shoes and bibs for their children.

The most valuable feature in this wonderful art is the cheapness and facility with which it is performed. Heretofore, a few individuals in the community have been able to have their portraits painted by artists who, after devoting years to study and training, have been able to produce a picture bearing some resemblance to the person for whom it was designed, but the pictures of the photographer, though possessing a fidelity unapproachable by any painter that ever lived, are produced with a rapidity and ease that places them literally within reach of all classes in the community. This art contributes a thousand fold more to the sum of human happiness than the art of painting.

The ease with which photographs are taken, and the cheapness at which they are sold, has reached its highest development in the carte de visite. A man can now have his likeness taken for a dime, and for three cents more he can send it across plains, mountains, and rivers, over thousands of miles to his distant friends.

One of the most interesting results of the ease and cheapness with which photographs are produced is the prompting which it will give many persons to have their likenesses taken frequently during their lives. What would a man value more highly late in life than this accurate record of the gradual change in his features from childhood to old age? What a splendid illustration would such a series of photographs make in every household. First, the new-born babe in his mother's arms; then the infant creeping on the floor; next the child tottering by the mother's apron; then the various phases of boyhood, till the sprouting beard tells of the time when the plans and hopes of life began to take form and purpose; another portrait with softer locks and eyes is now coupled with the series, and the stern warfare with the world begins; the features henceforward grow harder and more severe; lines slowly come into the forehead and grey hairs mingle with the locks; the lines grow deeper and the head whiter, till the babe is changed into the wrinkled and grey old man, so different but still the same! Even when life is closed the power of the photographer has not ceased. The fixed fea-

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tures that return no answering glance to the last fond look of surviving love are caught and indelibly preserved to its memory.

The Stevens Floating Battery in 1852.

In looking over the back volumes of this paper our attention has been attracted by the following article which appeared on page 285, Vol. VII. (old series) SCIENTIFIC AMERICAN (1852). Steam batteries being a theme which is exciting the interest of all nations at the present time, we think it desirable to refresh the public mind in regard to what was thought of the subject ten years ago :—

On the 11th instant (May, 1862), Senator Stockton addressed the Senate at length on the resolution authorizing the building of a war steamer for harbor defence, in pursuance of a law authorizing a contract for that purpose with Robert L. Stevens. He said he desired to impress upon the senate the necessity of providing a harbor defence, and to have justice done to one of his constituents who had been ungenerously treated by the former Secretary of the Navy. "It was his opinion that the present state of affairs in Europe rendered war probable, and in that event there was danger of us being brought into it. The harbor of New York is not now any better than it was during the war of 1812, and fleets now approached the United States uninterrupted by winds or tides. With a speed of 20 miles per hour, a steamer could pass beyond the range of a fort in five minutes. To obviate the attack of a foreign fleet, it was necessary that there should be a construction for harbor defence, combining the qualities of stone with the power of motion. This vessel being shot and bomb proof, could do more to resist the progress of hostile fleets than twenty forts. Mr. Stevens, the author of the design, is an accomplished and experienced gentleman, who is willing to hazard his character and reputation on the success of the undertaking." Thus, and a great deal more, senator Stockton spoke in reference to a steam floating battery.

A petition has also been presented to Congress by a person professing to be acquainted with steam navigation, who believes that he can construct an ocean craft which can neither be burnt or sunk (even if stove against icebergs or rocks), nor blown up by its boilers, and which will average, in a voyage across the Atlantic, fifteen miles an hour, and he will undertake to build the vessel providing the Government will remunerate him in case of success. He asks Congress to place in the Deficiency Bill a provision giving him and his associates, or their legal representatives, the sum of one million of dollars upon condition of his producing such a vessel within five years from the passage of the act, to be adjudged and reported on by a committee of five disinterested persons to be appointed by the President, on whose decision the Secretary of the Navy is to pay the money. The plan is, that the vessel is not to be less than four thousand tuns, forty rods long, and six wide ; to draw only from five to six feet of water when laden. She is to have two sets of boilers and engines, and four pairs of water wheels ; is to be of iron entirely, with zinc finishing ; the keelsons, ribs, &c., are to be of plate iron corrugated where proper, and made air-tight, forming air chambers. The floors or decks will be double, having sectional air chambers throughout, as will also the portions of the ship, including those forming the state rooms, cabins, &c., thereby rendering it impossible for her to sink. She is also to be subdivided by water-tight partitions. Although five years are asked, the memorialist says he can accomplish the work in two ; and although the condition of speed is fixed at the moderate rate of fifteen miles an hour, he has no doubt of accomplishing an average of from twenty to twenty-five miles per hour, besides having her shot proof.

Here, then, are two Richmonds in the field. The latter proposition, we believe, is the best. Mr. Stevens will no doubt accomplish anything he undertakes in the steamboat line, but a harbor floating fort would be a most useless appendage. Let us have a good steam fleet ; let our sea defence be upon the mountain wave. In an emergency, sand bank barricades can be thrown up for the defence of our harbors, and these, with heavy guns and brave hearts, need fear no foreign floating batteries.

NITRIC ACID FUMES.—Two men, employed in a chemical manufactory at St. Denis, France, were lately found dead in the street soon after leaving their work. Their bodies were removed to the Morgue for examination. The medical opinion was that their death was due to the inhalation of the fumes of nitric acid.

THE MANUFACTURE OF LEATHER CLOTH.

The London *Mechanics' Magazine* gives an interesting description of the manufacture of enameled oil cloth which it calls "leather cloth" and states that it was introduced into England from America, having been commenced at Newark, New Jersey in 1849. The establishment of Messrs. Crockett in London, England, in which it is made, is very extensive, covering ten acres of ground, employing 200 operatives, and turning out 15,000 square yards daily. Respecting the processes by which it is produced, our cotemporary says :—

It will be evident that an article intended to resemble leather should be pliant, supple, and not liable to peel off or to crack. These excellences are to be attained by the peculiar ingredients of the composition with which the cloth is covered, and the method of applying it. On entering the factory our attention was first directed to the boiling room, in which there are twelve furnaces, with a large cauldron over each for boiling linseed oil. This process is attended with considerable danger from the liability of the boiling oil to generate gas and explode ; hence, a man is stationed at each cauldron stirring gently the boiling mass and watching a thermometer inserted in it, and which at the time of our visit stood at 580°. The oil is supplied to the boiling house by pipes from an adjoining building, where there is a huge tank with nine compartments, containing 3,200 gallons each, or 28,800 altogether, amounting to 122 tuns of oil. The boiled oil being allowed to cool is conveyed on a tramway to the mixing house, where, in a puddling machine, it receives several other ingredients, the principal ones being lampblack and turpentine, which being mixed into a composition is ready for use.

The cloth to which this composition is applied is known by the name of "greys," or unbleached cotton. It is of a peculiar manufacture, and made expressly for the company. The store room is a spacious building, and will contain an immense stock ; at present it has 25,000 pieces, or 300,000 yards. Here the cloth is calendered, and cut into lengths of twelve yards. The two ends of each length are sewn together to make it endless ; two sewing machines are in constant operation at this work. The pieces are then removed to the "milling" rooms, so called because they contain the mills on which the cloth receives the composition. These mills are rough-looking wooden structures, having a drum at one end and a roller at the other, over which the cloth is passed, and then tightened by a crank and wheel at one end. A large frame knife or scraper is then dropped down close to the cloth, a measured quantity of composition being laid on the cloth along the edge of the knife, the mill revolves, and the cloth receives as much of the composition as can pass under the edge of the knife. The piece is then carried to the heating room adjoining, and hung up on the rack to dry till next morning.

There are on the premises six milling rooms, with three mills in each, and having three men attendant upon each mill. The adjoining rooms for drying are heated by three rows of pipes laid along the wall. These pipes, during the day, are at a temperature of about 130°. The temperature is increased toward the evening, and during the night to 160°, and it is the duty of the watchman to open the doors for ventilation and cooling preparatory to the men resuming their work for the next coating.

Of course, in a building so greatly heated, and having so much inflammable material within it, the danger of fire is imminent, but every precaution has been taken which prudence could dictate. The building is fire proof, the doors are of metallic lava, and the roof, which is flat, is of the same material. A large pipe runs up the outside wall by the partition which divides the drying rooms, into each of which runs a branch pipe with a valve, which can be worked from the outside. A deluge of steam can by these means be poured into the rooms in a few minutes by day or night. There are fourteen fire plugs around the buildings, on the main of the East London Waterworks, with hose and turncock at hand, so that ample means of extinguishing fire exist on the premises.

But to return to the manufacture. The coating being thoroughly dry, the cloth is then taken to the "rubbers," whose business it is to remove all inequalities from the surface and make it perfectly smooth. This is done by the "rubbing machine" (an ingenious contrivance of Mr. Eagles, the manager), by which the cloth is made to pass under two rollers revolving in opposite directions. These rollers are covered with pumice stone, and do the work completely and expeditiously, which, till lately, was done by hand at great expense of labor. The "coating" and the "rubbing" being repeated four, and in the case of heavy goods, five times, the cloth is ready for the "painters." The "painting rooms" contain machines similar to the "mills ;" but instead of the drum they have a roller at each end, over which the cloth passes slowly, and a man at each side applies the paint, "meeting each other half way." Dependent partly on the colors, and partly on the article to be produced, is the number of coats of paint to be applied. Sometimes two will be sufficient, at other times four are necessary. The last coat receives several applications of a peculiar elastic enamel, composed chiefly of copal varnish, to protect it from the action of the atmosphere.

At this stage of the process the edges of the cloth are rough and have to be trimmed, and the seam by which the ends are sewn together has to be cut. This is done by a machine called the "Guillotine," and we now follow the cloth to the "grainer." This latter, and, to the ordinary leather cloth, finishing process, is done by a remarkably beautiful iron machine, having two rollers, the upper one being of polished iron grooved obliquely on the surface, the under one of paper. Between these two rollers the cloth passes twice and receives its external resemblance to morocco leather. There are six machines used for this finishing process, and others for embossing from the small diamond to the large mediæval pattern. The latter consumes much more time in passing through the machines. The cloth is now stamped with the trade mark, labeled, and rolled up ready for transmission to the warehouse in Cannon street West.

On looking at the pieces when finished, one is struck by the extreme cleanness of the inner side after passing through so many soiling operations ; this is owing to the practical skill with which the men handle the cloth, and to the agility with which they remove it from the several machines, and carry it to the drying rooms. While watching the process we thought that, in many respects, it was similar to the tanning with sumac, from the leaves and stalks of the *Rhus coriaria*, by means of which skins are made into morocco leather. As the leather cloth can be made permanently soft and elastic by the oily matter combining with the texture of the cloth, as it does with the fibres of the skin, the imitation is complete and successful.

There is another room in this establishment, specially interesting to the artist, where the cloth i printed in gold and colors, in designs which are reall chaste and beautiful, and which, when used for th furniture and hangings, adorn rooms with somethig of oriental splendor. Here, too, there are tale covers with floral borders, rich in color and choicin grouping, with center pieces which, as specimen of decorative art, are very effective.

The French have been acquainted with the at of making oil cloth of this kind for a long time an we think they were the first who commenced its manufacture. A description of French oil cloth is gien on page 105, Vol. V., 1849 (old series), SCIENTIFIC AMERICAN, with a more minute account of the ingredients used. There is also a description of G. DeBruns' French patent for the manufacture of oil cloth on page 265, Vol. XIV., 1859 (old series), SCIENTIFIC AMERICAN. Sulphuric acid and the sulphate of inc, also the oxide of lead are boiled and mixed wit linseed oil to render it quick drying for the manufacture of this kind of cloth.

IN 1851 the value of machinery exported from England was £1,168,611 sterling ($5,843,055), last year it amounted to £4,250,000 sterling.

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RECENT FOREIGN INVENTIONS.

Composition for Preserving Wood.—The wooden posts of fences, the sleepers of railways, and all timber laid in the ground for any purpose, are very liable to rapid decay. Various compositions have been used to render them less liable to rot, and some of these, such as the chloride of zinc, corrosive sublimate and the sulphate of copper, have proven very beneficial. A composition consisting of coal tar, quick lime and ground charcoal, for treating railway timber, has lately been patented by J. Cullen, of the North London Railway Works. The tar is placed in an iron kettle and brought to a state of ebullition, then the lime and charcoal are added and stirred, when the wood is dipped into the hot mass, lifted out and laid past until it becomes dry. About a quart each of the lime and ground charcoal are added to every three gallons of tar. The timber so treated is filthy to handle, but it will last twice as long as clean timber used for railway sleepers in the common way.

New Stone Ware.—A patent has been taken out by A. C. Ponton, of Clifton, England, for manufacturing what has been called a new kind of stone ware. It is composed of ground sand and powdered flint mixed with melted sulphur, then molded like clay. This composition is colored with any of the pigments used for paints. It is not burned in a kiln like common stone ware, and is not adapted for exposure to hot water and high heat, but is suitable for molding into garden vases, and such like ornaments, and may be used for vessels containing cold water.

Cement for Leather.—A patent has been taken out by J. McKay, of Birmingham, England, for a cement made of purified gutta percha dissolved in the bisulphide of carbon, which the inventor employs to coat the surfaces of leather, for the purpose of rendering it water proof; it also forms an adhesive cement for uniting separate pieces of leather.

Treating Teazles for Napping Cloth.—The teazles which are employed on machines for carding the surface of woolen cloth prior to pressing it, are brittle and easily broken. For the purpose of rendering them stronger and more durable, they have been treated successfully with a solution of the sulphate of copper (blue vitriol), and afterward dried. A patent has been obtained by R. A. Brooman, London, for the improvement.

Preparing Tanning Liquors.—The substance in oak, hemlock and other barks, which combines with the gelatine of skins and forms "leather," is tannin. It is soluble in water, and is usually employed in vats for tanning purposes. If much exposed to the atmosphere, it is liable to decomposition by absorbing oxygen and becoming gallic acid, which does not possess tanning properties. A very great loss of tannin is experienced in all our tanneries by the liquors absorbing oxygen and changing into gallic acid. To prevent this loss, L. F. Duval and L. A. Beaudel, of France, prepare their tanning liquors in close vessels out of contact with the atmosphere, and charge the liquor with a neutral gas, such as hydrogen or nitrogen, by which chemical change in the character of the tannin liquors is prevented.

Nickel Iron.—A patent has been taken out by William Longmaid, of Inver, Galway, Ireland, for alloying iron with nickel in the puddling furnace. An oxide of nickel is first mixed with granular iron, and fused in a crucible containing some charcoal dust. About four ounces of nickel to the tun of iron is considered to be a proper mixture. The ingot of iron and nickel produced in the crucible is added to a charge of iron in the puddling furnace, and the whole is stirred and thoroughly mixed when fused. Iron thus alloyed with nickel will stand exposure to the weather without rusting. Copper and silver may also be alloyed with iron in the same manner, and any one of them will prevent the iron from rapid oxydization. It would be a great improvement to alloy the steel and iron employed for the barrels of rifles, with a small quantity of nickel.

Ladies' Leglet.—C. E. Wilson, London, has taken out a patent for an article which he terms a "leglet," to be worn by ladies around the ankles, during wet weather. It is made of water-proof cloth, and is either held in place with buttons or with elastic webbing. It protects the ankle where the dress comes in contact with it while walking.

Starch Compound.—In manufacturing starch from rice, T. Redwood, London, adds to the starch liquor an acid solution of the chloride of zinc, after which it is dried, reduced to powder, and is then fit for use. It is said to be useful for the purpose of rendering clothes starched with it almost uninflammable, and it enables linen to take a superior polished surface by ironing.

India-Rubber Compound.—In distilling palm and other vegetable oils, for the purpose of rectifying them prior to obtaining their stearic acid for making candles, a black, bituminous residuum is left behind in the retort. J. F. Williams, London, has taken out a patent for employing this substance, combined with gutta percha, to produce cheap, elastic, vulcanized articles. The bitumen and gutta percha, in about equal quantities, are first masticated together, then about five per cent of sulphur and chalk are added, and the whole thoroughly mixed. In this plastic condition it is molded into the form of the articles required, then submitted to heat in an oven and vulcanized.

Purifying Oils.—A superior oil for lubricating machinery, is made from crude whale or vegetable oil, by H. W. Spencer, of London, as follows:—The oil is first brought gradually to a state of ebullition, then an extract of nutgalls, at the rate of 4 lbs. to the 20 gallons of oil, is added and the whole boiled for six hours, then allowed to cool. The impurities are precipitated and settle to the bottom; the clear is the purified oil.

RECENT AMERICAN INVENTIONS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list.

Armament of Vessels.—The object of this invention is to effect the penetration of an enemy's vessel at its bottom or below the surface of the water and below where the armor is commonly applied to armor-clad vessels, either by means of projectiles discharged from mortars or other pieces of ordnance, or by torpedoes or other explosive contrivances; and to this end it consists principally in lowering the mortar or other piece of ordnance or explosive contrivance for this purpose, into the water through a well in the vessel from which it is to be fired, and running it out below the surface of the water, thereby obviating the exposure of the said piece or device, or the mechanism by which it is to be run out, above the water. The inventor of this war implement is Oliver C. Smith, of Salem, Mass,

Machine for Inserting and Securing Eyelets.—This machine is composed of a stationary hopper in which the eyelets are placed, and from which they are swept by an oscillating brush into holes provided for their reception in an intermittently rotating cylinder, by which they are delivered to a laterally oscillating inclined chute, which deposits them one by one on an upright pin working through an upright reciprocating bolster, by which, after the perforations provided in the cloth or other material for their reception have been placed over them, they are brought into contact with a stationary punch, and riveted; the several parts being operated by a lever, treadle or other suitable mechanical means by which they are severally put in motion. The inventors of this machine are T. K. Reed, of East Bridgewater, Mass., and H. F. Packard, of North Bridgewater, Mass.

Shingle Machine.—This invention relates to an improved shingle machine of that class in which saws are employed for cutting the shingles from the bolt. The object of the invention is to obtain a machine of the class specified which will admit of the bolts being fed to the saw by a continuous movement, and render the same capable of performing its work very expeditiously. The invention also has for its object facilitating the handling of the bolt in applying it to the machine so as to cut the shingles, butt and point alternately, from each end of the bolt. The invention has further for its object the applying of a dressing or roughing-off saw to the machine in such a manner that the bolts may be dressed or sawed in proper form for the machine, and be operated from the driving shaft thereof, and also rendered inoperative when desired by a simple treadle and gear mechanism. The inventor is Smith Head, of Millersburgh, Pa.

Door Knobs.—This invention consists in the arrangement of a sleeve with a square socket in combination with a screw thread into one of the knobs, and screwing on the end of the rod connecting the two knobs, and with a square projection on the inner end of the shank of said knob, corresponding to the square socket in the sleeve, in such a manner that by means of the screw thread in the knob and on the end of the connecting rod, the distance of the two knobs can be exactly adjusted to the thickness of various doors and at the same time, by the action of the square socket in the sleeve and of the corresponding projection on the shank of the knob, a spontaneous turning of said knob is prevented. G. N. Cummings, of Meriden, Conn., is the inventor.

Foot Warmer.—This invention is an improvement on a patent granted to the same inventor February 25, 1862, and it consists in the arrangement of a partition of sheet metal, or any other suitable material, in combination with the radiator and the body of the lamp, through the action of which the heat is conveyed to the feet of the person using this foot-warmer in such a manner that a separate combustion chamber is formed, and thereby the equal distribution of the heat throughout the foot chamber is facilitated, and that the body of the lamp is protected against the heat reflected by the radiator. It consists also in the arrangement of a channel at the upper end of the radiator, and of air holes in the sides of the foot chamber in combination with the combustion chamber with a quarter-cylindrical reflector and with a series of inslined bars, forming the support for the feet, in such a manner that the requisite amount of oxygen for feeding the flame is obtained, and at the same time an equal distribution of the heat in the foot chamber is effected, and that the feet, in being placed on the inclined slatted platform, are kept in a natural position. The inventor is Solomon Hunt, of Danville, Indiana.

Gold and Silver Amalgamator.—The object of this invention is to obtain an amalgamating device which will insure the contact of the particles of gold or silver which the ore contains with the quicksilver and without grinding the quicksilver, the device at the same time reducing the ore to a fine state in order that all the gold or silver may be liberated. The invention is designed more especially for operating in gold-bearing quartz, but is capable of being successfully used in the working of silver ore. The invention consists in the employment or use of a stationary plate provided with radial grooves or recesses and stationary plates of copper or thin metal which will amalgamate with quicksilver, said stationary plates being used in connection with a rotating plate provided with oblique or tangential grooves and a feed and discharge opening at its center, and a cap, all arranged to effect the desired end. The inventor is Thomas Varney, of San Francisco, Cal., and the patent bears date July 15, 1862.

Ornamental Uses of Transparent Mica.

In Paris mica has lately been applied for preserving, silvering and gilding decorations in churches and public buildings. The mica is first cut to the desired thickness with a knife, and is then coated with a thin layer of isinglass diluted in water, and the gold or other substance is applied, after which it is allowed to dry. A pattern of copper, with a design cut out on it, is then placed on the reverse side of the mica and the superfluous parts are removed. The colors are then applied in one or several coats, and the whole afterward coated with a solution of isinglass and diluted alcohol, by which the mica is rendered pliable. When this is effected the mica is applied to the object, which is coated with glue or other adhesive material, and allowed to become comparatively dry, after which the surface is made smooth by rubbing it gently with an agate burnishing tool. The value of mica depends on the size of the sheets and their transparency; the clear ruby tinged being the finest, and the cloudy grey the least valuable.

We recently took out a patent upon an improvement in powers to drive churns, for A. A. Drake, of Flanders, N. J. We are gratified to be able to say that our client has lately sold the right for the State of New York for the sum of six thousand dollars.

Business relating to patents is beginning to revive considerably. Just in proportion as the laboring population is drawn off by the war do the people experience the need of labor-saving machines.

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Berlin Castings.

The city of Berlin, in Prussia, possesses an unrivaled reputation for making fine castings in iron. Respecting such castings, R. Hunt, F. R. S., gives the following interesting description. He says :—

Dumas has stated that these remarkably delicate productions are due to the presence of phosphorus and arsenic in the iron from which they are cast. These substances certainly have a tendency to give great fluidity to the melted iron, and fluidity is essential to the production of such filigree work as we see in the elaborate bracelets, neck-chains, brooches, and fans which many of the Berlin foundries produce.

The reputed origin of this manufacture is interesting. At the time when the final struggle commenced between Prussia and Napoleon, the patriotism of the Prussian ladies was particularly conspicuous. They sent their jewels and trinkets to the Royal Treasury to assist in furnishing funds for the expenses of the campaign. Rings, crosses, and other ornaments in cast iron were given in return to all who made this sacrifice. These gifts bore the inscription, "*Gold von Eisen ;*" and these Spartan ornaments are to this day much treasured by the possessors in their families. The demand arising from these circumstances led to their wonderful delicacy, so much admired.

Notwithstanding the statement made by Dumas, we have been assured by a Prussian founder that the Berlin castings are largely made from English iron, and that the whole secret of the manufacture consists in securing the necessary fluidity of the melted metal by a very high temperature. A fine silicious sand is required to form the molds, and this, Ehrenberg informs us, is entirely composed of the shells of microscopic animalcules which once swarmed in the ancient seas that united the Baltic with the Black Sea.

Where chains are produced in Berlin iron, the central rosette of each link is the only portion really cast, the loops forming the connection being of wire bent to form, and laid into the prints provided for them in the mold. This being arranged, the metal to form the rosette is run in, fills the impression of it, and surrounds the ends of the iron rings, thus forming the link. We have, however, had in our possession a chain made by a German workman at the Hayle foundry, in Cornwall, which was nearly five feet in length, consisted of 180 links, and weighed about an ounce and a half, the whole of which was cast.

Cause of Boiling in Liquids.

Ebullition is produced when the globules come in contact with a solid. If, drawn by the currents which heating inevitably occasions, and they strike against the sides of the vessel, there is suddenly formed a bubble of vapor; the globule, becomes rather smaller, is projected violently from the point at which it produced this kind of explosion, and then continues floating in the medium. If, when the temperature is above 115° or 120°, a globule is touched with a glass or metal rod; an explosion is produced at the point of contact, a bubble of vapor is disengaged, and the globule rebounds, as though the solid point exercised a sudden repulsion over it. However, all solids, are not equally efficacious in producing this change of state; glass or metal rods sometimes fail, but a slender wooden or charcoal stick always incites an immediate and tumultuous ebullition in the middle of the overheated globules. If a few drops of water are dropped into linseed oil, heated to 105° or 110° in a porcelain capsule, they fall slowly to the bottom of the vessel. The instant they reach it, vapor is formed suddenly; the slightly diminished drop of water rebounds, then falls again, causing another disengagement of vapor; again it rises, and so on. The drops of water, while floating in the oil, before touching the bottom of the vessel, undergo no perceptible evaporation; it is only on their contact with a solid that there is a sudden production of a bubble of vapor.

Forests in Australia.—The forests in Victoria, Australia, are chiefly composed of gum trees. Decoctions of the woods and barks are medicinal, and also yield dyes. The leaves give an essential oil which is adapted for the preparation of resins. The odor is pleasant.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING JULY 22, 1862.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful t inventors, may be had gratis by addressing MUNN & CO., Publisher ofthe Scientific American, New York.

35,914.—James Armstrong, Jr., of Elmira, Ill., for Improvement in Corn Planters :

I claim, first, The arrangement of the oscillating valve, H′, and platform, n, in combination with the two channels, m, of the discharge tube, G, and with the seed distributing mechanism constructed and operating as and for the purpose shown and described.

Second, The arrangement of the hinged adjustable runners, H, secondary frame, D, and lever, J, in combination with the cutters, I, and shoes, I′, constructed and operating as and for the purpose specified.

[This invention consists in the arrangement of an oscillating valve working under a twin tube, and between the openings of said tube and a stationary platform, in such a manner that by said valve the seed dropping down through one branch of the twin tube is retained on the platform, while, at the same time, the seed deposited on said platform through the other branch of the twin tube is swept off and deposited in the furrow. It consists, also, in combining with the main seed slide a secondary transversely-adjustable slide with different rows of seed cells, in such a manner that by moving said secondary slide, the quantity of seed to be discharged can be regulated. It consists further in the arrangement of hinged adjustable runners in combination with inclined cutters and shoes, which serve to open the furrows, in such a manner that the depth of the furrows, and consequently the depth of planting can be regulated at pleasure.]

35,915.—J. K. Baer, of Highland, Ill., for Improvement in the Manufacture of Domestic Wines :

I claim the within described process of manufacturing wine by treating the diluted juice of vegetable substances, such as specified, with honey, substantially in the manner set forth.

[A notice of this invention appeared in No. 4 of the current volume of the Scientific American.]

35,916.—H. H. Beach, of Philadelphia, Penn., for Improved Device for Spreading Grain :

I claim spreading grain by causing it to pass from a primary channel or receiver down a series of radial inclined channels, increasing in width from the primary channel to the point where the series of channels terminate, when the bottom of each channel is formed in the manner described for the purpose specified.

35,917.—G. P. Bertrand, of Easton, Pa., for Improved Mirror for Attachment to a Window, &c. :

I claim a revolving mirror, A, hung upon a rod, B, with plugs, c d, nuts, f j, and stops, i, as and for the purpose shown and described.

[This invention consists in the arrangement of two swivels or plugs fitting into sockets at right angles to each other in combination with the rod from which the mirror is suspended, in such a manner that the said mirror can be adjusted in any desired position, right or left or up and down, with the greatest ease and facility, and that the same can be made fast when properly adjusted.]

35,918.—Samuel Boorn, of Lowell, Mass., for Improvement in Looms :

I claim my improved loom picker cushion case as made with a notch or recess, b, arranged with reference to its cushion, and for reception of the picker or picker staff, in manner and for the purpose substantially as specified.

I also claim the cushion case, as provided, or made with the loop slots extending through its bottom or rear part and out of its cushion chamber, in manner and for the purpose as described.

35,919.—Gail Borden, Jr., of Amenia, N. Y., for Improvement in Concentrating and Preserving for use Cider and other Juices of Fruits :

First, I claim as a new article of manufacture or merchandise the juice of apples, grapes, currants or any other fruits from which vinous liquors are or can be made so concentrated that it will be unaffected by the influence of external heat and moisture until properly diluted, the same being placed in casks or other and suitable vessels to permit it to be readily handled or transported, substantially as hereinbefore contemplated and described.

Second, I claim as a new article of manufacture or merchandise, sweet cider so concentrated that it will not be affected by external heat or moisture, until properly diluted, the same being placed in casks or other suitable vessels to permit it to be readily handled and transported, substantially as hereinbefore described.

35,920.—J. H. Brinton, of West Chester, Pa., for Improvement in Hoppers of Machines for Sowing Grain, &c., Broadcast :

I claim, in combination with the wedge-shaped opening through the hopper bottom, the wedge-shaped vibrating bar, d, when said bar is supported upon adjusting devices below the hopper, and is furnished with spuds which extend up into the hopper, substantially in the manner and for the purpose set forth,

35,921.—A. R. Burdick, of Racine, Wis., and C. D. Read, of Elgin, Ill., for Improvement in Corn Harvesters :

We claim the segments, G′, and cutters, M, with or without the screw, F, arranged to operate substantially as and for the purpose herein set forth.

We further claim, in combination with the screw, F, segments, G, and cutters, M, the bars, A A B B, frames, C C, and bars, E E, all arranged for joint operation as and for the purpose specified.

[The object of this invention is to obtain a machine by which corn may be picked from the standing stalks and husked at the same operation. To this end the invention consists in the employment of a screw in connection with cutters and yielding segments applied to a guide frame, whereby the desired end is attained.]

35,922.—F. A. Chapelle, of Paris, France, for Improvement in Tents :

I claim the attachment to and combination with a tent of the character and general disposition herein referred to, of hammocks suspended in the manner and for the purposes herein set forth.

35,923.—Daniel Clow, of Janesville, Wis., for Improvement in Harvesters :

I claim the adjustable hinged stirrup, E, in combination with the pitman, D, when constructed and arranged in relation to each other, as specified and for the purposes described.

Also the springs, G G2, in combination with the said stirrup, E, and the pitman, D, when the several parts are constructed, arranged and operate in the manner and for the purpose specified.

Also the crosshead, C, in combination with the said pitman, and the main driving wheel, A, when the several parts are constructed, arranged and operate in the manner and for the purposes specified.

35,924.—G. N. Cummings, of Meriden, Conn., for Improved Mode of Attaching Door Knobs to their Spindles :

I claim the employment or use of a sleeve, C, with a square socket, d, in combination with a square projection, e, on the end of knob, A, said knob being secured to the rod, B, by means of screw threads, c c′, as and for the purpose herein shown and described.

35,925.—James Donning, of Paterson, N. J., for Improvement in Burners for Coal-Oil Lamps :

I claim the cones, e and f, connected to each other and removable together from the wick tube, and provided with the openings, 2 2, to regulate the action of the air on the flame, the parts being proportioned, substantially as specified and for the purposes set forth.

35,926.—Otto Ernst, of New York City, for Improvement in Tobacco Pipes :

I claim the piston pipe or tube formed of glass in the manner specified, and constituting a new article of manufacture for smoking tobacco, as set forth.

35,927.—Josiah Eveland, of Elizabeth City, N. J., for Improvement in Machines for Turning Irregular Forms :

I claim, first, The combination in the machine specified, of two or more cutter frames so arranged as to operate with different rates of speed in their traveling movement, substantially as and for the purpose set forth.

Second, The arrangement of the belts, i j n, and loose pulleys, k m, with the shaft, B, and screw shaft, G, substantially as shown, for the purpose of readily communicating motion to the pattern and work and stopping the same simultaneously with the throwing of the screw shaft, G, in and out of gear with the nuts of the pulley frames, F, of the cutter frames, C C′.

[This invention relates to an improvement in what is generally known as Blanchard's Lathe, for turning irregular forms, and which consists of a rotary cutter placed in a swinging traveling frame acted upon by a pat t ern in such a mannerat the cutter will act upon the stuff and cut it in a form corresponding with the pattern. Mr. Eveland's address is Elizabethport, N. J.

35,928.—H. C. Fletcher, of Eden, Vt., for Improved Machine for Cutting Roots :

I claim, first, The cutters, G H, when connected to swinging pendants, E, so arranged that the cutters will move in the arc of a circle, substantially as and for the purpose set forth.

Second, The construction and arrangement of the parts to which the cutters are directly attached, to wit, the curved side pieces, f f, and bar, F, when said parts are arranged with the lower curved ends of the side pieces, b b, of the hopper, to operate as set forth.

[The object of this invention is to obtain a device for cutting roots for the feeding stock and other purposes, which will be exceeding simple, capable of being manufactured at a reasonable cost, and operates with less friction and consequently with a less expenditure of power than those previously constructed.]

35,930.—Lavinia H. Foy, of Worcester, Mass., for Improvement in Corset Skirt Supporters :

I claim a corset skirt supporter constructed substantially as represented in Fig. 1,

35,931.—R. A. Goodyear, of New York City, for Improvement in Snap Hooks :

I claim as an article of manufacture the snap hook, constructed substantially as herein described, by providing the same in lieu of the ordinary metallic spring, with a spring made of vulcanized india rubber, and locating the same within the body of the hook or of the snap or of both, in combination with a shoulder upon the hook or snap to prevent the rubber spring from falling out or being displaced.

35,932.—G. W. Griswold, of Logansport, Ind., for Improved Bridle Halter :

I claim the straps, k k, united to the bit, and hooked or buckled to the head or forehead strap, the whole being constructed and operating substantially in the manner and for the purpose herein described.

35,933.—G. W. Griswold, of Logansport, Ind., for Improved Can for Preserving Fruits, &c.:

I claim a fruit can or jar, having a tapering neck, as described, down which a cork or a cork and liquid packing may be forced or drawn by atmospheric air, produced by the shrinking of the contents of said can or jar, as described and for the purposes mentioned.

35,934.—G. H. Hawkins, of New York City, for Improvement in Bonnet Frames :

I claim a bonnet frame, A, consisting of wires, B C D D′, and braces, E, said braces being looped at the ends and soldered to the wires, B C D, at the several points of contact, when united with a suitable crown and covered with a net, or its equivalent, all substantially as shown and described.

[This invention consists in a bonnet frame made of a series of wires and braces, said braces being looped at the ends and soldered to the wires at the several points of contact, the whole being united with a suitable crown and covered with a net or its equivalent, in such a manner that a light, strong, cheap and durable bonnet frame is produced.]

35,935.—G. F. Hawley, of Vienna, Ill., for Improvement in Machines for Filing Saws :

First, I claim the adjustable sliding frame, E, provided with the internal frame, I, and internal sliding frame, K, in connection with the adjustable clamp, G, and adjustable rest, o, or its equivalent, all arranged substantially as and for the purpose set forth.

Second, The socket, o, index, r, and segment, s, as shown and described, when applied to the sliding frame, K, and used in connection with the frames, E I, as and for the purpose specified.

Third, The index, i, and graduated block, F, the index being attached to the frame, E, and the block, F, attached to the bar, h, when said index and block are used in connection with the frames, E I K, as and for the purpose set forth.

[The object of this invention is to obtain a machine by which saws may be expeditiously filed or sharpened in such a manner that all the teeth will be acted upon and sharpened precisely alike, thereby producing perfect work as well as facilitating the operation of saw filing.]

35,936.—Solomon Hunt, of Danville, Ind., for Improvement in Foot Warmers :

I claim the combustion chamber, G, interposed between the lamp and the radiator, substantially in the manner and for the purpose here in shown and described.

35,937.—G. B. Jewett, of Salem, Mass., for Improvement in Artificial Legs :

I claim, first, The leg piece, A, to which the foot, B, is hinged a one end, and the spindle, D, at the other, substantially as described.

Second, I claim the shoulder, e, and pad, i, for limiting the motion of the foot, B, substantially as specified.

Third, I claim the block, E, with the spring, F, attached to its front in the manner substantially as set forth.

Fourth, I claim connecting the socket, H, to the spindle, D, in the manner substantially as specified, whereby the length of the leg may be adjusted.

Fifth, I claim, in combination with a spindle, D, pivoted to the head of the leg piece, A, the plate, h, and pad, m, for regulating and limiting the motion of the joint or the position of the leg when straightened out, substantially as set forth.

Sixth, I claim the combination of the socket, H, and its adjustable pad, O, with the leg piece, A, when they are hinged and connected together, substantially in the manner specified.

35,938.—W. B. Kehew and C. H. Fifield, of Salem, Mass., for Improvement in Hot Air Registers :

We claim, first, The employment, over the registers or outlet pipes of hot air furnaces, of the upright tubes, B and C, the outer tube being perforated at the lower end, in the manner specified.

Second, We claim placing in the inner tube, B, the tubes, E E E, the whole arrangement operating in the manner and for the purpose substantially as set forth.

35,939.—M. R. Kenyon, of Providence, R. I., for Improvement in Lamp-Chimney Cleaners :

I claim, first, A series of elastic wiping fingers, each of which is fixed at one end and is loose at the other end, which, by its own elas-

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ticity, acts independently of the others, and exerts a yielding pressure against the interior walls of a lamp chimney when placed therein, substantially as herein shown and described for the purpose specified.

Second, The arrangement of two sets of such fingers so that the loose ends of one set of fingers extend toward the fixed ends of the other set of fingers, substantially as herein shown and described, for the purpose specified.

Third, In combination with two sets of elastic fingers so arranged, two sliding disks arranged with a spiral spring or an equivalent force to press the said disks or other sliding piece, toward the fixed ends of each set of fingers, substantially as shown and described for the purpose specified.

35,940.—G. H. Kidney, of Cleveland, Ohio, for Improved Clothes Wringer:

I claim the combination of the slotted angular curved lever, E E, roller, A A, springs in boxes, D D, the jaws, H H, and self-adjusting levers, F F, all arranged as and for the purpose specified.

35,941.—James Lee, of Stevens Point, Wis., for Improvement in Breech-Loading Firearms:

I claim the hammer, E, provided with a notch, g, and applied in combination with the notched tongue, d e, on the rear of the barrel, substantially as and for the purpose herein described.

[This invention relates to the attachment of the barrel of a breech-loading firearm to its stock frame by means of a vertical pivot, upon which it is capable of turning horizontally to expose the open rear end of the barrel on one side of the fixed breech for the reception of the cartridges. It consists in so construcing the rear end of the barrel and the hammer, and so applying the hammer in combination with the barrel that the latter may be locked to the breech in a closed condition in all positions of the hammer but that of half-cock, and is unlocked in that position of the hammer.]

35,942.—W. A. Lighthall, of New York City, for Improvement in Steam Boilers:

I claim producing a forced and continued circulation of the water in a steam boiler, either through the tubes of the boiler or through and in the shell or body of the same by mechanical means, as and for the purposes herein set forth.

35,943.—W. S. Mabbett, of Calverton Mills, Md., for Improved Preserving House:

I claim the combination of the ice chamber, B, and ice compartment, C, with the waste pipe, G, arranged within the building, A, as and for the purpose herein set forth.

[This invention consists in a novel arrangement of an ice chamber and waste pipe within a building, whereby a continuous circulation of air is maintained within the building from top to bottom, and the warm air, as it enters the building, immediately reduced in temperature before it can come in contact with the articles to be preserved,]

35,944.—G. T. May, of Tompkinsville, N. Y., for Improved Gaff Sails:

I claim the application of the strain rope, c, or its equivalent, diagonally from clew to throat of a gaff sail, as specified, in combination with a gaff sail whose head, d, and luff, e, are of equal length with each other, and whose after-leech, f, and foot, g, are also of equal length with each other; so that when the upper half, A, is doubled down on either side from the line of the strain rope, c, upon the lower half, B, the sail will be thereby reduced in area just one-half, will be also a smoothly duplicated or two-fold sail over the area of the said lower half, the strain rope, c, or its equivalent, then becoming a bolt rope to the bight of the double sail, and so that by thus resetting the upper half in juxtaposition with the lower half the said doubled sail will be also thereby trimmed for use on either tack without any necessity for furling the said upper half, substantially as specified.

35,945.—William Meigs, of Waynesville, Ohio, for Improvement in Harvesters:

I claim, first, The reel formed of curved rods or beaters, t, fitted in arms, r r s, arranged as shown; in combination with the curved or semicircular sickle bar, P, and platform, L, as and for the purpose specified.

Second, The cam, U, constructed as shown, in connection with the spring, W, and longitudinal slot, c′, in the rake arm, V, for the purpose of operating the latter, as set forth.

Third, The stationary rake, B′, arranged as shown, in combination with the intermittingly-rotating rake arm, V, for the purpose specified.

[This invention consists: first, in the employment or use of a semicircular cutter, in connection with a curved reel, whereby the grain may be cut and laid on the platform in an even manner, favorable for the operation of a revolving rake which rakes it therefrom. The invention consists, second, in a novel raking device for raking the cut grain from the platform, whereby the cut grain may be deposited in gavels on the ground, at the rear of the machine, ready for binding.]

35,946.—J. C. Pennington, of Paterson, N. J., for Improvement in the Manufacture of Nitrate of Potash from Nitrate of Soda:

I claim the within-described process of manufacturing saltpeter and bicarbonate of soda, by treating nitrate of soda with bicarbonate of potash, and alternately crystallizing from the solution, bicarbonate of soda and nitrate of potash, substantially in the manner described.

[This process is based on the insolubility of bicarbonate of soda, as compared with the proto-carbonate.]

35,947.—H. O. Peabody, of Boston, Mass., for Improvement in Breech-Loading Firearms:

I claim, first, Having the under part of the breech block slotted, as shown at e, in combination with the pin, d, and lever, E, as and for the purpose herein shown and described.

Second, The employment of the roller, i, and its spring, G, in combination with the notches, j l, and block, D, as herein shown and described.

Third, The combination of the lever, F, with the breech block, D, and frame, A, as herein shown and described.

[This invention relates to the use of a movable breech block, arranged to swing on a pin or joint, which attaches its rear end to the stock, and which opens the rear end of the barrel for the reception of the cartridges, by a downward movement. The invention consists, first, in a novel mode of operating such breech block, by means of the trigger-guard lever. Second, in the application to the said breech block of a spring, which serves to stop it in the position for loading, and to return it to the latter position after it has been moved below such position, for the purpose of operating upon the device, which draws the discharged cartridge cases from the barrel, and assists in returning them to the position for firing. And it consists, thirdly, in a novel mode of operating the contrivance for withdrawing the discharged cartridge cases.]

35,948.—Asa Pettengill, Jr., of Petersborough, N. H., for Improvement in Stave Machines:

I claim the combination of the switch, F, with the guide, E, the saw, A, and the carriage, D, the whole being made to operate substantially in manner and for the purpose as specified.

I also claim the above-described arrangement and combination of the guard, H, and the chute, G, with the switch, F, the guide, E, the saw, A, and the carriage, D.

35,949.—E. O. Potter, of New York City, for Improvement in Cartridges:

I claim uniting solid or pressed powder to a ball, by a belt or zone of collodion, in the manner and for the purpose substantially as described.

35,950.—H. F. Read, of Brooklyn, N. Y., for Improvement in Pipe Wrenches:

I claim in combination the hollow handle, C, spiral spring, i, chain, h, and eccentric, B; substantially as described and for the purpose set forth.

35,951.—E. R. Reed and N. F. Reed, of Hyde Park, Vt., for Improved Mop Head:

We claim the employment of the lever, B b, hinge, C, and spring catch, E, arranged to operate together, substantially as herein described.

35,952.—T. K. Reed, of East Bridgewater, Mass., and H. F. Packard, of North Bridgewater, Mass., for Improvement in Eyelet Machines:

We claim, first, The combination of the hopper, D, the rotating cylinder, F, the cam, H, and the chute, I, substantially as and for the purpose herein specified.

Second, The oscillating brush, E, applied and operating in combination with the hopper, D, and cylinder, F, substantially as and for the purpose herein described.

Third, The stationary brush, G, applied and operating in combination with the hopper, D, and cylinder, F, substantially as and for the purpose herein set forth.

Fourth, The curb, J, and inclined plane, K, applied and operating in combination with the cylinder, F, and chute, I, substantially as and for the purpose herein specified.

Fifth, The combination of the laterally-oscillating chute, I, the reciprocating bolster, L, pin h, and fixed punch, l, the whole arranged and operating, substantially as and for the purpose herein set forth.

35,953.—Henry Reichert, of Shippensburg, Pa., for Improvement in Flour Bolts:

I claim, first, The combination of the bars, C C, and sliding hammers, F, and adjusting plates, H, substantially as set forth.

Second, The combination of the rods or straps, G G, with spring arms, E, hammers, F, and arms, C C, as and for the purposes set forth.

35,954.—Horace A. Robison, of Cleveland, Ohio, for Improvement in Apparatus for Pressing and Ironing Hats:

I claim, first, The tapering tenon, B, and tapering mortise with the projection, C, for the purpose set forth.

Second, The collar, and tenon or journal, D2, in combination with the tapering tenon, B, and mortise, as above described.

35,955.—C. H. Robinson, of Boston, Mass., for Improvement in Lamps:

I claim the wick tube and wick, moving vertically together, instead of moving the wick alone, as heretofore practiced.

I also claim the simultaneous vertical motion of the wick tube and button, by which their distance apart is always kept uniform, by means of the screw and attached parts, as herein fully described, or their equivalents.

35,956.—J. A. Schneider, of Cleveland, Ohio, for Improvement in Truss Pads:

I claim, in combination with a hinged pad plate, E, the spiral spring, G, cog wheel, H, and worm screw, I, the whole being arranged in the manner substantially as set forth, and for the purpose specified.

35,957.—O. C. Smith, of Salem, Mass., for Improved Submarine Armament of Vessels:

I claim the combination of the mortars, J, and mortar carriages, F G, with the passage, H, and wells, D, substantially as and for the purpose herein shown and described.

The combination of the windlasses, E E L L, with the carriages, F G, and mortars, J, in the manner and for the purpose herein shown and described.

The combination of the horns, C C, and crossbar, I, with the mortar carriages, F G, in the manner herein shown and described.

35,958.—Pierre Thiry, of Paris, France, for Improvement in Horseshoes. Patented in France May 27, 1861:

I claim the herein-described apparatus to be applied to the shoes of horses, mules and other shod animals, to prevent them from slipping in frosty weather, the same consisting of a brace extending across the foot, and a toe clip extending from the toe backward, when both are provided with spikes, and are constructed to operate substantially in the manner and for the purpose herein set forth.

35,959.—L. W. Turner and H. H. Mix, of Meriden, Conn., for Improved Trace Fastening:

I claim the rod or shaft, D, provided with the pendent lip, e, and thumb piece, E, in combination with the box, C, spiral spring, b, and draw iron, B, with or without the stop, j, all arranged and applied to the whiffletree, substantially as and for the purpose set forth.

35,960.—G. W. Van Brunt, of Horicon, Wis., for Improvement in Seeding Machines:

I claim, first, The concentric-chambered recess, k, in the cap, G, in combination with the cylinders, E F, and seed openings, s, when arranged to operate in the manner and for the purpose set forth.

Second, The cones, N, having a horizontal circular flanch, m, at their lower ends, in combination with the peculiarly-shaped tubes, M, when constructed in the manner specified.

35,961.—Jacob Van Horn, of Plainfield, Ill., for Improvement in Cultivators:

I claim the combination of the peculiarly-constructed standards, S, with the removable wings, a, the regulating oars, B B′, and braces, F, all arranged and operating as and for the purposes described.

35,962.—G. W. Walker, of Boston, Mass., for Improvement in Cooking Stoves:

I claim constructing the oven so as to open toward the fire-place grate, and providing the opening with a register, or means by which heat and light from the fuel, when on fire in the grate, may either be radiated directly into the oven or excluded therefrom, substantially as and for the purposes above specified.

I also claim the arrangement and combination of the register-slide chamber, B, the register, K, the open grate, a, oven, A, and the flue space about the oven, the whole being substantially as above described.

35,963.—Henry Warner and B. F. Palmer, of Boston, Mass., for Improvement in Ventilating Windows for Tents:

We claim, first, A secondary hood or cowl attached to the canvas of the tent near the apex, when the same is so arranged that it can be raised at one or more points by cords worked from the interior of the tent, and returned to position by weights, or their equivalents, the whole operating in the manner substantially as described.

Second, A sliding canvas shutter, D, arranged substantially as described, in combination with an aperture, I, for the purposes specified.

35,964.—T. W. Wisner, of Oceola, Mich., for Improved Ready Marker:

I claim the longitudinally-sliding blade, B, or its equivalent, in combination with the handle, A, and spring catch, c, constructed and operating substantially as and for the purpose shown and described.

[This invention consists in the arrangement of a longitudinally-sliding pointed blade in combination with a suitable handle and spring catch, in such a manner that by turning the open end of the handle down and releasing the blade, the latter slides out to its working position, in which it is retained by the spring catch, and by turning the open end of the handle up and releasing the spring catch, the blade slides down into the interior of the handle, and is retained in this position by the spring catch, so that the instrument can be conveniently opened and closed with one hand, and that the same, when not used, can be conviently carried in the pocket.]

35,965.—J. P. Woodbury, of West Roxbury, Mass., and S. S. Gray, of Boston, Mass., for Improvement in Sabot for Feathered Projectiles:

We claim the employment, in combination with a winged shot, of a sabot, externally cylindrical and fitting the gun, and enveloping and inclosing the wings, and made with a central aperture, C, for detaching the same, substantially as described.

35,966.—Calvin and G. M. Woodward, of New York City, for Improvement in Steam Pumps:

We claim combining a crank and fly wheel with a direct connection steam pump, by means of a vibrating link, G, and sliding box, d, arranged and applied in connection with the piston rod and between the steam and pump cylinders, substantially as herein specified.

[This invention consists in combining a crank and fly wheel with a direct connection steam pump, by means of a vibrating link and sliding box, arranged and operating substantially as described.]

35,967.—J. M. Brown (assignor to himself and Daniel McLaren), of Cincinnati, Ohio, for Improvement in Car Brakes:

I claim the shaft, G, having a fast collar, N, and an adjustable collar, O, loose friction windlass, R, nut, P, and spring, Q, or their equivalents; the whole being so combined as to produce an automatic relaxation of excessive brake tension, substantially as set forth.

35,968.—George Campbell (assignor to himself, George Gage and G. C. Gage), of Waterford, N. Y., for Improvement in Circular Knitting Machines:

I claim, first, The employment for operating the take-up roll or rolls, D D′, of a lever, F, attached to the rotating frame of the take up, and rotating with the said frame, in contact with a fixed eccentric, q, a pawl lever, E, carrying a pawl, i, and a ratchet wheel, h, geared with the said rolls, the whole combined, applied and operating substantially as herein specified.

Second, Controlling the action of the take-up by the tension of the cloth by means of the frame, H, bar, t′, roller, I, spring, K, or its equivalent, and rod, L, the whole applied in combination with the take-up rolls, and with the pawl, i, from which they derive motion, substantially as herein specified.

[This invention relates to the take-up of those cylindrical knitting makines in which the needle plate or needle ring, and the work, have a rotary motion; and it consists in a certain means of producing and controlling the movements of a pair of take-up rolls arranged above the knitting machine, with their axes perpendicular to the axis of rotation of the needle plate or plates.]

35,969.—William Canter (assignor to himself and Samuel Bernstein), of New York City, for Improvement in Machinery for Manufacturing Chenille:

I claim, first, In machines for producing chenille, cutting the plush of a proper length at a continuous operation, after winding it around the two belts, G G, by carrying it when so wound, under or past a cutting edge acting in the plane between said belts, substantially as herein specified.

Second, I claim in such machines the insertion of one of the wires or cords, in the triangular or other suitable space between two endless belts, G G, and the covering material, for the purpose set forth.

Third, I claim the use, in chenille machines, of the twisted cords, U U, and dividing post, W, when used to operate in connection with the shaft, J, or its equivalent, on the machine, so as to be moved with a velocity corresponding with the means of delivering the chenille to be twisted, substantially in the manner herein set forth.

35,970.—R. M. Davis, of Eaton, N. Y., assignor to H. L. Hopkins, of Lebanon, N. Y., for Improvement in Harvesters:

I claim, first, A finger bar, so combined with the frame of the harvester and the mechanism by which the cutters are vibrated, that it may at pleasure be turned over, so that the machine may be drawn in either direction and perform the same duty, substantially as described.

Second, I claim combining with the outer end of a finger bar of a harvester, a track clearer for the purpose of sweeping the cut grain or grass inward as it falls over said finger bar by mechanism, substantially such as represented and described whereby the track clearer is made to always project rearward or behind the finger bar, and at an acute angle therewith, its movements being governed by the rotation of the finger bar, substantially as described.

Third, Combining with the inner end of the finger bar an operative arm, and by mechanism substantially such as described, the opposite end of said arm with the main frame and draft pole which is pivoted to the main body of the machine, whereby the finger bar may be inverted either by turning the main body of the machine or without changing the main body of the machine, substantially as described.

Fourth, Combining with the inner end of the finger bar an operative arm, provided with an extension joint, Q, and the ball joints, i w, or their equivalents, whereby the finger bar may be supported at any desired elevation, and the rotation thereof be accomplished by means, substantially such as described.

Fifth, The combination of the pitman or connecting rod, with the crank head at one end, and to the knife bar at the opposite end, so that the cutter bar may be inverted without disconnecting the pitman, substantially as shown.

Sixth, The combination of the pitman or connecting rod, with the knife bar, E, and finger bar, D, whereby they may both be rotated in the manner substantially as represented and described and for the purposes specified.

35,971.—J. H. Doolittle, of Derby, Conn., assignor to himself and Franklin Farrel, of Ansonia, Conn, for Improvement in Wrenches:

I claim a wrench formed with an angle, substantially as herein before described for the purpose set forth.

35,972.—William F. Ensign, of Lansingburgh, N. Y., assignor to James Willcox, of Brooklyn, N. Y., for Improvement in Felling Guide for Sewing Machines:

I claim as new and useful in sewing machines, guides which serve to fold or turn the edge of the material being sewed, constructing the former or formers of said guides of an elastic blade or blades, capable of springing to adapt themselves to different thicknesses of material, substantially as herein specified.

And I further claim the combination and arrangement in one instrument, and relatively to each other, either of the surfaces of the former or formers, so that two edges engaged simultaneously within said surfaces, of the same or different material, shall by the feed be presented to the needle, and across its path folded and interlocked, substantially as described and shown.

35,973.—S. M. Feezler, of Seneca Falls, N. Y., assignor to himself, Van R. Stuck and Samuel Thomas, of Fayette, N. Y., for Improvement in Horse Powers:

I claim the set of gearing composed of the parts, B C D E E and G G, arranged, combined and operating substantially as and for the purposes herein set forth.

I also claim the draft trees, M M M′, secured respectively to the sweeps, by means of swivel joints, h h, so as to have a free turning motion when the same are connected with each other, by means of the flexible chains, N N N′ and P P P′, substantially as and for the purposes herein specified.

35,974.—Smith Head (assignor to himself and William McKissick), of Millersburgh, Pa., for Improvement in Shingle Machines:

I claim, first, The endless belt, C, provided with the dogs, F, and bars, G, and fitted to the adjustable bed piece, B, as shown, and used in connection with the saw, H, to operate as and for the purpose set forth.

Second, The box, K, provided with the endless apron, M, and inclined back, m, in combination with the saw, H, and endless bolt-feeding belt, C, all arranged for joint operation, as and for the purpose herein specified.

Third, The combination of the bolt-dressing saw, I, with the shingle saw, H, when the former is provided with a feeding bed, N, operated through the medium of the rack, O, and pinions, P U, the latter being on an adjustable shaft, R, connected with a lever, S, having a treadle, T, attached and arranged as shown, whereby the bed, N, may be operated at the will of the attendant from the driving shaft, E, having a constant motion.

35,975.—J. R. Irwin, Administrator of William Irwin deceased, late of North Coventry Township, Pa., and Edmund Guest, of Pottstown, Pa.; the said William Irwin was assignee of the entire interest in said invention,) for Improved Washing Machine:

We claim, first, The box, A, with its semi-cylindrical rubbers, D and K, when the latter is so connected to the levers, M and N, or their equivalents, so as to be thereby raised and lowered, and when a vibrating motion is imparted to the two rubbers in contrary directions, as set forth.

Second, The use of the plates, d, for the reception of the journals of the rubber, K, the said plate being so constructed as to guide the upper rubber to its proper position, as specified.

35,976.—William Peters (assignor to himself and Alfred Buck), of Baltimore, Maryland, for Improvement in Coating the Bearings of Boxes for Axles, Shafts, &c.:

I claim lining the bearings of boxes for axles shafts, &c., with the plates, slabs or blocks made of the materials herein set forth.

35,977.—T. W. Roys and G. A. Lilliendahl, of New York City, assignor to said G. A. Lilliendahl, for Improvement in War Rockets:

We claim, first, Causing the issuing gas to infringe upon spiral wings or equivalent defectors at a little distance in the rear of the orifice or orifices, substantially as and for the purposes herein set forth.

Second, The use of the internal casing, C, within the rocket, are

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ranged in the manner and so as to equalize the issuing of the gases, as herein set forth.

35,978.—J. H. and G. W. Smith, of Portchester, N. Y., assignor to J. H. Smith, aforesaid, for Improvement in Tombstones:

We claim introducing the sulphur or other cement generally used for securing together the tablets and pedestals of tombstones through channels, d, passing up from the bottom of the pedestal, substantially in the manner and for the purpose herein shown and described.

[The object of this invention is to facilitate the operation of connecting the tablet or headstone with the base or pedestal of a tombstone, and to conceal all traces of this operation, or of the cement used in the same.]

35,979.—C. C. Stansell, of Middleboro', Mass., assignor to himself and A. W. Rockwood, of Newton, Mass., for Improvement in Lamps:

I claim the above described arrangement of an annular flame adjuster, f, with a stationary tubular wick, D, and wick tube, B, the whole being to operate together as specified.

I also claim the combination of the flame adjuster, F, in manner substantially as described, viz., with an annular space, g, arranged around the wick and immediately below the part, f, which presses against the wick, the same being for the purpose as herein before specified.

35,980.—C. H. Griffin (assignor to W. D. Richards), of Lynn, Mass., for Improved Apparatus for Grinding Ores and Amalgamating the Precious Metals:

I claim, first, The combination of the rotating cylinder, D, with the adjustable swinging rubber, h, both being arranged, constructed and operated in the manner substantially as and for the purposes described.

Second, In connection with these, I claim the hopper, E, and spout, F, the double-funnel shaped basins, G and G′, hollow shaft, H, disk, m n and o, as provided with arms, s and p, and tub, I, the whole being arranged, constructed and operated in the manner substantially as and for the purposes set forth.

Third, I claim in combination with the basins, G and G′, or their equivalents, and hollow shaft, H, through which the ores to be amalgamated are passed and fed into the mercury, the arrangement of a series of disks, m n and o, the upper and lower ones of which are provided with arms or stirrers, and the middle one with perforations, the whole being submerged in mercury, operating in the manner substantially as and for the purpose set forth.

35,981.—William Reynolds, of Manchester, N. H., for Ivment in Looms:

I claim in combination with the rocker and rail, a grooved standard at one or both ends of the rail, curved or otherwise, for the purpose of holding the rocker on the rail, when it (the rocker) is worked to throw the shuttle, substantially as described.

I claim the roller, L, in combination with the grooved standard, K, and rocker, G, for the purpose set forth substantially as described.

35,982.—Ferdinand Garber and Sylvanus Shimer, of Terre Haute, Indiana, for Improvement in Dirt Scrapers:

We claim, first, A combination of wheel, Z, and roller, G, with its levers, b b, and braces.

Second, The scraper, a a′, and trough with their braces all subserving the uses of scraping, leveling and distributing, substantially as set forth.

35,983.—Samuel Kingsland, of Lyndon, Wis., for Improved Wool-Bending Machine:

I claim, first, The application to wood bending of hollow cylindrical forms, constructed, arranged and operated as herein described.

Second, The construction and arrangement of the metal plates, C C′ C″, in combination with the hollow cylinder, A B, arranged thereon and secured together by the cross braces, a′ a′, and cross tie, m′, with their journals and journal bearings, crank, e, door, h, draught hole, b, and pipe, c, all arranged in the manner and for the purpose specified.

Third, The peculiar means of adjustment for the feed rollers, a a a a, by means of the projections, n v and v′, set screws, g, and sliding boxes, m, all being arranged, constructed and operating in the manner and for the purpose described.

Fourth, A wood-bending machine combining a heated cylinder or cylindrical forms, supported by plates, C C′ C″, or equivalent means, with their means of adjustment as described, supplied with fuel and heated in the manner described and operated by a crank or other equivalent means, substantially as and for the purpose specified.

RE-ISSUES.

1,324.—J. J. Eckel (assignee of A. Randel), of New York City, for Improved Oil Presses. Letters Patented March 8, 1862:

I claim the hollow plunger, B I, solid curb, C, with a perforated cylinder, D, placed within it and so arranged as to allow vertical escape passages between them for the exit of the oil or grease, and the perforated central discharge tube, E, in combination with the perforated horizontal plates, F G and H, arranged as shown, or in any convenient way to admit of lateral escape passages for the oil or grease between the central tube, E, and the perforated cylinder, D, as set forth.

I further claim the bed, A, hollow plunger, B I, solid ribbed curb, C, surrounded by bands, C′, shrunk upon its periphery, perforated cylinder, D, perforated central discharge tube, E, supporting tube, E′, perforated plates, F G and H, and bars, c e g, all constructed, combined and arranged in the manner and for the purposes herein before explained.

[The object of this invention is to afford a more ready means than has been hitherto provided for the exit or escape of the oil or grease from the substance under compression, and thereby not only effect a saving in power, but also cause the work to be performed in a much more thorough manner than usual.]

1,325.—Richard Montgomery, of New York City, for Improvement in Iron Cars. Letters Patented August 7, 1860:

I claim, first, The use of the corrugated iron beams, constructed as described when applied to railway cars and other vehicles, in the manner and for the purposes set forth.

Second, The combination of the curved top pieces, B, with the side or base pieces, A, and coupling pieces, H and G, arranged and operating substantially as described.

Third, The combination of the cross pieces, C, with the arched supports, D, substantially as and for the purposes set forth.

Fourth, The corrugated covering, F, arranged as described in combination with the arched top pieces, B.

Fifth, The coupling pieces, H & G, severally, and their application jointly or severally, in the manner and for the purposes set forth.

1,326.—N. K. Wade and Joseph Kaye, of Pittsburgh, Pa., for Improvement in Metallic Wheels for Fly Wheels, &c. Letters Patented September 4, 1860:

We claim constructing wheels with rim and hub or both, of metal cast on curved spokes or arms of wrought iron or other flexible material, substantially as for the purpose herein before set forth.

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The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes in the fees are also made as follows:—

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The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

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Every applicant for a Patent must furnish a model of his invention if susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

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We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

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Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

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All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

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It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

Notes and Queries

J. H. T., of Colorado Territory.—We know of no patent with which your plan for an amalgator would interfere.

B. A. H., of Iowa.—A patent right is not real estate. It is not necessary to record the deed of a patent right in the County Clerk's office. It needs only to be recorded at the Patent Office Washington.

G. E., of Ohio.—The sand that you send us is mostly magnetic oxide of iron, mixed with a few grains of quartz, and we believe some fragments of garnets. The magnetic oxide is one of the most valuable iron ores, but is worthless unless it occurs in large quantities.

O. S. C., of Pa.—In modern warfare the use of chain has been discussed. A great number of plans of cannon for firing the chain shot has been presented to this office within the past year, but they are all impracticable.

L. D., of Mass.—The mouth pieces of pipes are often made of amber. The piece you send is amber. You ask too much when you request a full explanation of their manufacture, &c.

W. P., of Ill.—A patent for casting steel plows was secured in November, 1860, by F. F. Smith, now of Collinsville, Conn.

R. S. C., of Ind.—We have never had an opportunity of comparing the amalgam bells with those made of bell metal; the name "amalgam," we suspect, is intended to convey a false impression,

J. F., of Pa.—A bar of steel or cast iron may be magnetized by drawing it several times from the middle to the end across one pole of a magnet, returning it through the air, and then drawing it from the middle to the opposite end across the other pole of the magnet. More powerful magnetism is imparted by surrounding each end of the bar with a cylinder of soft iron, and passing a current of electricity through an insulated wire wound in a helical form around the cylinders.

A. O. M., of N. Y.—You may be able to obtain fullers' soap at some of the druggists' in the village where you reside. It is not an artificial product, as you suppose, but a natural clay, and a very pure silicate of aluminum. It is found in California and various other parts of the world, and is alkaline in its character. It is employed for washing woolen fabrics which are dyed with fugitive colors, and it was much used for washing clothes by almost all semi civilized nations before soap was discovered.

H. W., of N. Y.—The oxide of chromium is used for the green ink that is employed in printing bank notes. The color is very permanent and beautiful, but the ink made with it soon wears out engraved steel plates. As a polishing substance for metals, the oxide of chromium is superior to fine emery and tripoli.

W. T. J., of N. Y.—You can easily make the sulphate of zinc, by dissolving strips of sheet zinc in oil of vitriol (sulphuric acid). It forms in clear small crystals, which are used for mixing with boiling linseed oil to render it quick drying. It is used for no other common purpose in the arts, so far as we know, except for emetics, in very small doses, by some old practitioners.

Money Received

At the Scientific American Office on account of Patent Office business, from Wednesday, July 23 to Wednesday July 30. Persons having remitted money to this office will please to examine this list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

J. C., of Mich., $20; R. T. C., of Ill., $20; T. S., of Ohio, $20; J. F. D., of N. Y., $10; A. R., of Iowa, $20; I. B. J., of Ohio, $20; J. & T., of Wis., $20; J. S. W., of N. Y., $20; M. M., of Ohio, $20; W. P. T., of N. Y., $20; L. & P. K. D., of N. Y., $20; J. L., of N. Y., $22; E. W., of Mass., $20; J. Q. A. S., of Pa., $20; P. W. McK., of N. Y., $20; D. F., of Ohio, $60; W. P. B., of Mich., $15; A. G. E., of Mass., $15; H. G. T., of Mass., $15; O. L. B., of Mass., $35; H. C. H., of Iowa, $15; E. H. M., of N. H., $15; J. W. F., of Pa., $10; A. J. & C. L., of N. Y., $30; R. R. G., of Ill., $25; J. D., of Ill., $15; C. W. G., of Mass., $25; D. & K., of Conn., $25; I. S. R., of Md., $15; S. B. W., of Ohio, $25; C. S., of Ill., $25; G. H. C., of Ill., $15; G. R. S., of Mich. $15; J. I. R., of N. Y., $15; J. T. E., of Ill., $15; J. H. McG., of Ohio, $25; D. K., of Pa., $25; O. B. N., of Conn., $15; N. S. H., of Mo., $25; A. O. C., of N. J., $15; H. N. G., of N. Y., $25; W. H. J., of

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Ind., $15; S. R., of N. Y., $15; D. W. W., of N. Y., $15; W. F., of Mich., $15; H. H. C., of N. Y., $15; H. S., of Pa., $10; R. B., of N. Y., $15; A. T., of N. Y., $25; G. H. W., of N. Y., $28; R. H., of N. Y., $20.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from July 23 to Wednesday, July 30, 1862:—

J. L., of N. Y.; J. R. B., of Ind.; D. & K.; of Conn.; R. R. G., of Ill.; O. L. B., of Mass.; H. G. T., of Mass.; W. J., of Minn.; C. W. G., of Mass.; D. P. P., of Cal.; L. D. G., of N. J.; C. S., of Ill.; R. B., of N. Y.; A. T., of N. Y.; N. S. H., of Mo.; D. K., of Pa.; S. B. W., of Ohio; G. H. W., of N. Y.; H. N. G., of N. Y.; T. J. McG., of Ohio; W. H. J., of Ind.; R. H., of N. Y.; H. S., of Pa.

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Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
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Consultation may be had with the firm between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Offices are cordially invited to call at their office.

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AMESSIEURS LES INVENTEURS—AVIS IMPORtant. Les Inventeurs non familiers avec la langue Anglaise et qui préféreraient nous communiquer leurs inventions en Français, peuvent nous addresser dans leur langue natalle. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront regues en confidence. MUNN & CO.,
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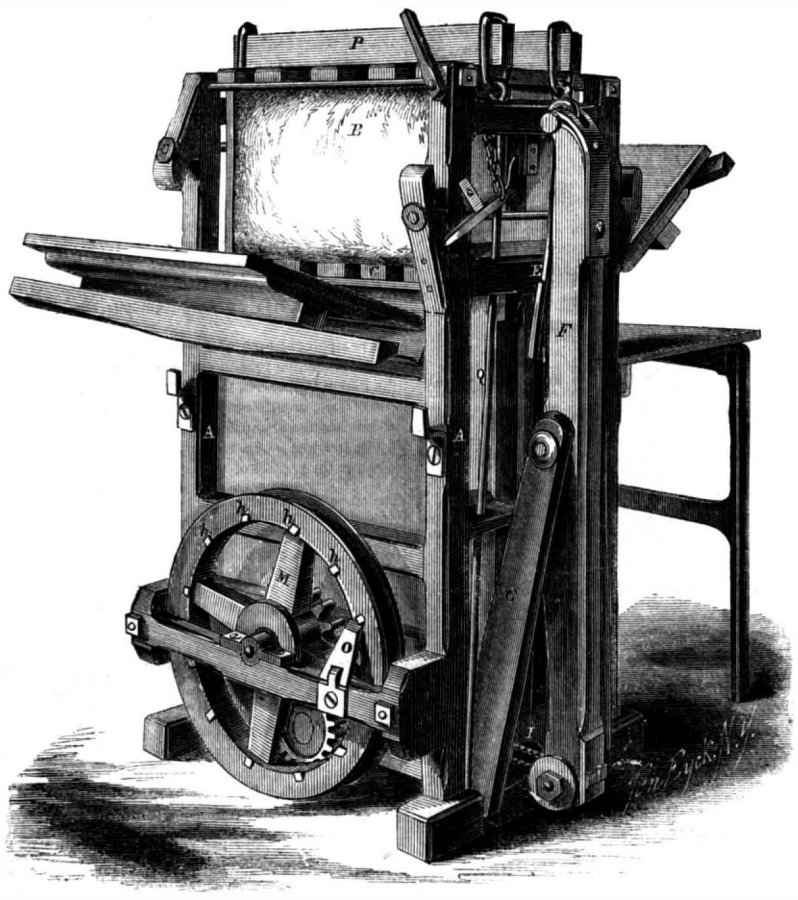
Improved Baling Press.

The accompanying engravings represent an improved press for use in compressing cotton, hay, &c., into bales for transportation. It is a modification of the toggle-lever press, as the reader will observe.

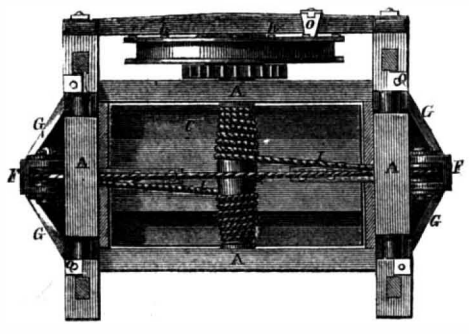
Fig. 1 is a perspective view of the press, and Fig. 2 is a horizontal section or a view of the press from below looking upward. The cotton, B, or other material to be pressed, is placed in the upper part of the box formed by the square framing, A, where it is compressed by forcing upward the follower, C, by means of the toggle-jointed levers, F and G. Projections from the ends of the follower pass through vertical slots in the sides of the frame, and are connected to the upper ends of the levers, F, by the links, E. Each lever, F, has hinged to it, near the middle, two levers, G, the lower ends of which diverge and rest upon a roller at the side of the frame. The lower ends of the levers, F, are provided with pulleys around which an endless rope, I, passes; this rope being wound also around a shaft in the lower end of the frame, in the manner clearly shown in Fig. 2. This shaft is connected by gears with the driving wheel, M, which may be turned by horse or other suitable power.

Fig. 1



ROBERTS'S BALING PRESS.

Fig. 2



It will be seen that turning the shaft in one direction will draw the lower ends of the levers, F, inward toward the frame, and thus force upward the follower, C, with the constantly-increasing power peculiar to the toggle joint; while turning the shaft in the opposite direction will allow the follower to descend.

The upper plate, P, of the bale box is held in place by the strong iron rods, Q, at the sides of the frame, and the box is provided with movable doors and adjustable sides for convenience in regulating the size of the bale, and removing it when formed.

It will be seen that by placing the shaft for the rope, J, across the middle of the frame, the strain is directly endwise, and equal upon both sides, preventing any tendency to rack the frame from its proper shape, or to break it except in the few places where it may be made abundantly strong. Making the rope in a single piece prevents its stretching from deranging the uniform action of the levers upon both sides of the frame, and the position of the pulley, M, is such that it does not interfere with the management of the press.

Application for a patent for this invention has been made through the Scientific American Patent Agency, and further information in relation to it may be obtained by addressing the inventor, Benjamin Roberts, at Clintondale, N. Y.

A Baryta Mine.

At Chester, Conn., there is a mine three hundred feet in depth and extending several hundred yards horizontally into the bowels of the earth. Large masses of a white crystalline substance streaked with yellow, are obtained in this subterranean artificial cavern, and these sparry crystals are used in large quantities for mixing with white lead paint. This heavy spar is the sulphate of baryta; it is ground in mills and sold for about twenty dollars per tun. When mixed, weight for weight, with white lead, it is called Venice White; when mixed with one-third of white lead it is called Dutch White. The purest white varieties are the most valuable, and for certain kinds of painting it is preferred to pure white lead. All lead paints become black when exposed to sulphurous gases, but these vapors have no such effect upon baryta.

Teeth Set on Edge.

All acid foods, drinks, medicines and tooth washes and powders, are very injurious to the teeth. If a tooth is put in cider, vinegar, lemon juice, or tartaric acid, in a few hours the enamel will be completely destroyed, so that it can be removed by the finger nail as if it were chalk. Most people have experienced what is commonly called teeth set on edge. The explanation of it is, the acid of the fruit that has been eaten has so far softened the enamel of the tooth that the least pressure is felt by the exceedingly small nerves which pervade the thin membrane which connects the enamel and the bony part of the tooth. Such an effect cannot be produced without injuring the enamel. True, it will become hard again, when the acid has been removed by the fluids of the mouth, just as an egg shell that has been softened in this way becomes hard again by being put in the water. When the effect of sour fruit on the teeth subsides, they feel as well as ever, but they are not as well. And the oftener it is repeated, the sooner the disastrous consequences will be manifested.

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To the Inventor!

The SCIENTIFIC AMERICAN is indispensable to every inventor, as it not only contains illustrated descriptions of nearly all the best inventions as they come, but each number contains an Official List of the Claims of all the Patents issued from the United States Patent Office during the week previous; thus giving a correct history of the progress of inventions in this country. We are also receiving, every week, the best scientific journals of Great Britain, France and Germany; thus placing in our possession all that is transpiring in mechanical science and art in these old countries. We shall continue to transfer to our columns copious extracts from these journals of whatever we may deem of interest to our readers.

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FROM THE STEAM PRESS OF JOHN A GRAY

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